THE EFFECTIVENESS OF BALANCED SCORECARD MANAGEMENT ON PATIENT SAFETY, CULTURE CHANGE AND PATIENT SATISFACTION

By

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Abstract:

Background.

Balanced scorecard (BSC) was widely used as an effective tool in healthcare organization management to improve financial outcome, quality of care, patient satisfaction and personal growth of employee. Most of previous studies are focus on the research on single organization and short-term effect on performance measurement. There are limited researches to explore the effectiveness about the sustain BSC management on the change of performance measure. Till now, there are limited data to understand the successful factors to attain the organization goal and limited researches to understand the correlation of four perspectives in the value chain.

In this research, I will try to examine the change of key performance indicators in different perspectives related to value chain by the utilization of sustain BSC management.

Goal:

The first purpose of this research is to examine the effectiveness of BSC management on quality indicators related to patient safety. The secondary purpose is to understand the change of patient satisfaction after sustain BSC management. The third purpose is to exam the effectiveness of BSC management on the patient safety culture. The fourth purpose is to survey the change of employee satisfaction under sustain BSC management. The fifth purpose is to exam the different of financial growth between the studied hospital and similar psychiatric hospital that didn't use BSC framework for hospital management in Taiwan.

Method:

We collect five data files including key performance measurement in BSC management structure, data file of TCPI (Taiwan clinical performance indicators), data file of the satisfaction of patient and employee surveyed by the of Ministry of health and warfare; data file of the survey of patient safety culture, and the financial revenue of psychiatric hospital of similar characteristic from 2010 to 2015 to present the difference and development trend after sustain implementation of BSC program.

Results:

We use the descriptive and analytic statistic to examine the difference after the implementation of BSC program and the progressive change of every year to examine the effectiveness of the BSC management on the key measurement in the value chain. The quality indicators related to patient safety including fall, self-injury events, violent events, involuntary restraint, elopement and discharge against medical advice revealed significant change after implement of BSC management in initial two years. The indicators related to patient safety improved when the action plan is in process. The density of fall events increased since 2013 even under the sustain execution of BSC management.

The sustain execution of strategic plan can maintain the patient safety at good level and improve quality of care, but the indicator of patient safety may get backwards when cessation of action plan.

Most of the dimensions of patient safety culture in studied psychiatric hospital had higher

than average score of all public hospital groups and all psychiatric hospital groups of Ministry of health and welfare. Patient safety culture reveal significant difference in the domains of teamwork cooperation, safety climate, perception of hospital management, working condition, in 2014 compared to 2013. The positive organization citizen behaviors such as altruism and organization commitment have been established after the conductance of BSC management. The improved part is consistent with the characteristic component of effectiveness of BSC management.

The significant improvement is found in the dimensions of inpatient satisfaction survey, the satisfaction toward hospital environment, professional attitude, medical process, communication and safety, and service outcome are all improved after sustain implementation of BSC management.

In the process of BSC management, most of employee are satisfied with the part of learning and growth, job condition, work climate and organization commitment. They are less satisfied with promotion opportunity and welfare of organization. The satisfaction of employee had mild improvement under sustain execution of BSC management.

The growth rate of financial revenue of studied psychiatric hospital is higher than the psychiatric hospital with similar characteristic in Taiwan.

Conclusion:

The BSC management had positive effectiveness on the quality indicators related to patient safety, scores of patient safety culture and organization citizen behavior, inpatient

satisfaction, and employee satisfaction. Finally, the growth rate of financial revenue enhanced in this study. The results are compatible with the hypothesis about the BSC management can activate the value chain of healthcare to delivery good quality of medical service. The development of consensus and employee commitment with organization vision and the service process can achieve the strategic goal after sustain conductance of BSC management. The positive influence on these indicators is established resulted from the team coordination and creative adaptation with the challenge of environment through BSC management.

Limitation:

The research is based on retrospective analysis of the data file from the survey performed by different department according to different interest. It is difficulty to build up the correlation of factors in different perspective due to the limitation of date content that without original data. The analysis of data and the results are presented as cross section view about the outcome in different perspectives of BSC framework. There are significant limitations of data to understand the correlation between these outcome measurements. The major confounders and selection bias existed to influence the interpretation of the outcome measurement. It is difficulty to differentiate the relationship and interaction of the factors in this research. The results are the study of single organization, without control group, the results cannot be generalized to other organization. In the future, the major influencing factors on the improvement of key indicators of four perspectives should be further explored and the correlation relationship between outcome indicators in different perspectives need further studies.

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Chapter one: Introduction.

1. Background.

Balanced scorecard (BSC) was widely used as an effective tool in healthcare organization to improve financial outcome, quality of care, patient satisfaction and personal growth of employee. In most of previous studies are focus on single organization and short-term effect on performance measurement. There are limited researches to explore the cause effect of BSC management on the indicators. Till now, there are limited data to understand the successful factors to attain the organization goal and limited data to understand the correlation of factors between four perspectives in the management of healthcare organization.

In this research, I will try to examine the change of important measurement indicators of value chain after sustain conductance of BSC management. We try to evaluate the effectiveness of BSC management on the key performance measurement of quality of care related to patient safety, change of satisfaction of patient and employee, and patient safety culture to understand the influence of BSC management on the organization change.

2. The aim of this study

The primary purpose of this research is to examine the effectiveness of BSC management on the quality of care and the indicators of patient safety, that is to say, after the implementation of the balanced scorecard program to organize the action plans conducted by different department will improve the quality indicators related to patient safety in the perspective of internal process of balanced scorecard.

The secondary purpose of this research is to understand the change of patient satisfaction after the implementation of BSC management.

The third purpose is to study the change of patient safety culture (one dimension of organization culture) after the conductance of BSC management.

The fourth purpose is to examine the effectiveness of sustain BSC management on the satisfaction of employee.

The fifth purpose is to exam the different of financial growth between the studied hospital and similar psychiatric hospital that didn't use BSC framework for hospital management in Taiwan.

Chapter two: Literature review.

1. The definition of quality and measurement

It is human right to maintain at good health state, but how to attain the goal of the health for all is a significant challenge for the healthcare organization. Michael Porter state that" the patients could not satisfied with the medical service even under the increased expenditure of medical service in modern era, how to create the value-based medical service focus on the quality of care and good outcome of intervention is the solution of modern service in 21 century" (Porter, 2009). Based on this statement, it is very important for healthcare organization to build up the patient-centered service system to assure the quality of care and actualize the mission

about health for all.

The healthcare provider always confronted unprecedented challenge from the change of health policy, social economic environment and technological advancement. Under the competitive pressure, how can the hospital achieve the mission to maintain the medical quality and patient satisfaction simultaneously, and to promote the financial performance? It needs innovative strategies to manage the threat of environment and internal weakness to achieve the goal of organization vision.

What is the medical quality and how to measure the quality in the healthcare service, we can traced back to 30 years ago when Donabedian created the framework of quality and

measurement, he had declared the concept of quality of care and put forward the framework to approach the quality in healthcare service. He address the synthesized framework to assess the quality of care from perspectives of structure, process and outcomes based on the results of researches. The measurement of quality is developed by Donabedian and his colleague and been applied in healthcare organization for continuous improvement based on this structure that the validity had been established (Donabedian, 1988, 2005).

According to Donabedian's framework, the quality of medical care can be evaluated from three perspectives and integrated as global concept. The domain of the structure represent the infrastructure with rather stable characteristic of organization to provide supportive resource to maintain the service working, this perspective consisted of human resource and available service such as clinic professional personnel, organization facility, financing support, community network, technology equipment and informatics system. The domain of process perspective consist of the focus on the technique and delivery process that consist of the prevention intervention, access of medical service, continuity of care, systemic management of patient safety, and the state-of-the-art treatment patient will receive. The domain of outcome is defined as the change of health status after the intervention, consist of the measurement of the change of symptoms, function level, quality of life, satisfaction with service, and adverse effect including mortality (Donabedian, 2005;

Harris & Bratzler, 2013; Reerink, 1990; Schroder, Larsson, Ahlstrom, & Lundqvist, 2010)

There are different limitations in each type of quality measurement, measurement of structure are subject to the response bias, process measurement may be influenced by the characteristic of patients and the outcome measurement should be adjusted according to the complex of patients' illness in the different clinical situation. The validity of these measurement based on Donabedian's framework of medical quality consist of face and content validity need more research to establish for the further application in healthcare organization (H. Chen, Yu, Hailey, & Wang, 2014; Delnoij & Westert, 2012; Sidani et al., 2014)

IOM (institution of Medicine), had publish "Crossing the Quality Chasm: A new Health system for the 21st century, declare the 6 major aims for all healthcare organization to define the quality of care. That is safe, effective, patient-centered, timely, efficient and equitable, and the patient-center care. Healthcare organization can follow the 6 aims and 10 rules of IOM to guide the policy to improve quality, but how to transfer these abstract concepts to measurable indicators that represent the adequate response to the need, value, and preference of the patient still need further breakthrough from the comprehensive survey of the researches results (Harolds, 2015).

In the early 1990, the U.S National quality forum and National Committee on Quality Assurance began to establish quality measurement from evidence-based care, especially from the measurement of delivery process of care. Health Experience Data and Information

Set (HEDIS) had develop standards of performance measurement and stated that the criteria of quality measurement should meet the following characteristic: (1) it must have the clinical importance, that is to say the measurement of quality indicators can stand out the important dimension of the quality of care, (2) validity, the measurement should have the scientific base and can represent the domain that is measured, (3) feasibility, the information of measurement is easy to be collected and can be applied to different places for quality improvement.(Campbell, Roland, & Buetow, 2000; Dean Beaulieu & Epstein, 2002; Eddy et al., 2008; Levine et al., 2005; Lied, Malsbary, Eisenberg, & Ranck, 2002).

The meaning of quality in healthcare can be defined in different level of healthcare system, there are different perspectives of quality measurements from macro view to micro view. The indicators can be built up from the dimension of national policy, management outcome of healthcare organization, to the practice quality of clinical care. In the healthcare system, there are different orientations to assess quality of care according to different professional field. In the care of mental health, the service is provided in complicate way that should integrate biological, psychological and social perspectives, and the service was provided from prevention, treatment, rehabilitation and long-term care. The quality indicators can be measured in these domains. The utilization of indicators to measure the quality derive from RAND assessment system is focus on the leading problems that the healthcare organization faced and the further improvement by organization management.

The major challenges to improve quality based on the indicator measurement consist of what is the right selection of indication, how to assure the validity, what is the solution for the quality problems, and how to lead the staff engage with quality improvement program and sustain the convincing belief in the daily practice (Dixon-Woods, McNicol, & Martin, 2012; Woitha et al., 2014)

Economic Co-operation and Development (OECD) had defined mental health as one of the healthcare priority for people in the selected five areas, had developed healthcare quality indicators project to evaluate the performance of service. They also use the utmost important indicators to review the difference between participating countries based on the international comparison to build up the benchmarking system of global and regional areas to initiate the improvement in mental health (Mattke, Epstein, & Leatherman, 2006; Moran, O'Connor, & Borowitz, 2013; Rotar, van den Berg, Kringos, & Klazinga, 2016). The comprehensive Mental Health action plan of WHO had established the goal of mental healthcare improvement related to the quality of care for the member countries to be attained in 2020. It also use this evaluation system to solve the problems of mental health in underdeveloped countries (Gater, Chew, & Saeed, 2015). European psychiatric Association had recommend the quality assurance, quality control and management based on Donabedian's framework to establish the guidance to deal with diagnosis, prevention and management of mental disorder for continuous improvement in mental health (Gaebel et al.,

2015). In different countries, they had developed indicators to measure the quality of care and to improve mental health. US had developed the market-driven performance indicators of mental health to meet the expectation of patients' need with complicate diagnosis (Essock, Olfson, & Hogan, 2015). Australia had developed indicators related to safety from social perspective to evaluate the connection between strategic goal and action plans to improve mental healthcare (Allen, Braithwaite, Sandall, & Waring, 2016). In the U.K, they emphasize the necessary of governance and control to make sure of the efficiency to deliver the mental health care and use the related indicators to evaluate the clinical performance to improve the healthcare (Ikkos, Sugarman, & Bouras, 2015; Kendall, Glover, Taylor, & Pilling, 2011). Scotland had implemented social integration program and designed the delivery system to promote mental health and welfare of patient from the point of subjective experience of patients (Coia & Glassborow, 2009).

An expert panel of the Organization for Economic Cooperation and development (OECD) had identified 12 indicators across four main domains to evaluate the quality of care, that is (1) continuity of care (2) coordination of care (3) treatment integration and (4) patients outcome (Lora, Lesage, Pathare, & Levav, 2017; Mattke et al., 2006). The U.N had developed 32 indicators across four domains which are (1) demographic and socioeconomic factors, (2) health status, (3) determinants of health and (4) health systems. In the United State, they found there is significant gap between the patients' expectation about service

and the perspective of healthcare provider, so they try to develop the patient- centered indicators to improve the patient safety and quality of care (Bierman, Lawrence, Haffer, & Clancy, 2001)

International organization had developed the indicators in country level to monitor the performance of current status of national policy and to compare the quality of care among different countries. In healthcare organization level, the indicators were built up with the comprehensive framework to evaluate the quality of service, and the treatment outcome of intervention for the specific population group. In the clinical practice setting, the individualized indicators of process and outcome according to the different medical service provided had been used to represent the quality of care. In addition, the indicators had expand from the measurement related to mental disorder to the personal protective factors related to mental health such as resilience, self-esteem and self-efficacy to promote the mental health. In the evaluations of healthcare systems and program, the instruments and software to collect data for analysis should be developed to set global norms and standards for further improvement of quality under comparison. These activities can be strengthened under the systemic analysis of measurement and comparison to establish the scientific basis of the quality in medical care (Murray & Frenk, 2008; Murray, Frenk, & Evans, 2007).

The selection of Indicators to measure the quality of care can be done according to different level of healthcare system. The following factors need to be considered to assure

the validity of quality such as purpose of measurement, difference of clinical setting and treatment modality, different patient group, and domains of service process. The main goal of indicator measurement is for comparison and continuous improvement, so the measurement indicators should be refined according to the different characteristic of service areas such as primary care, hospital level, or national scope to test the validity of measurement and further application (Hermann et al., 2000; Hermann & Palmer, 2002; Parameswaran, Spaeth-Rublee, & Pincus, 2015)

AHRQ (Agency for Healthcare Research and Quality) is the agency to select the indicators to monitor the improvement of quality based on the research results from whole nation. The indicators were formulated by the expert panel consensus meeting from the involvement with government agencies, clinicians, organization manager, healthcare provider, consumer group and researchers. AHRQ had developed more than 300 process indicators according to different patient group or vulnerable population to establish the measurement system to maximize the improvement of quality. They emphasize the indicators must be meaningful, feasible and actionable in the healthcare service for quality improvement movement. The domains of quality indicators in AHRQ including treatment outcome, patient safety, continuity of care, access of service, coordination of care and prevention strategies (Fisher, Spaeth-Rublee, & Alan Pincus, 2013; Herbstman & Pincus, 2009). NCQA (national committee for quality assurance) and JCAHO (Joint Commission on

the Accreditation of Healthcare Organizations) developed the quality indicators to measure the performance in hospital for accreditation evaluation and quality assurance. JCAHO had focused on the outcome of treatment by the utilization of Indicator measurement system developed since 1994 for audit and evaluation about hospital management. In recent year, the bundle of quality indicators are invented in clinical practice to assure the quality of care delivered in medical process based on the integration of indicators related to process and outcome, not just focus on the monitoring of single indicator. These indicators can be used to compare the quality of clinical performance between different healthcare organization. The validity and feasibility of indicators can be attained by the continuous refinement according to the different characteristic of institutions (Rubin, Pronovost, & Diette, 2001). NCQA emphasize the framework to integrate the health information to measure clinical performance and the transparent structure to provide the data for the consumer. The essential component of framework in NCQA consist of the specification of the data element, linking to the record system with standard definition, continuous monitoring of the measurement outcome and the sharing of the data to improve the quality in medical service.

Maryland Hospital Association had developed the quality Indicator Project (QIP) in 1985 to monitor the clinical quality. These indicators were used to compare the performance in different institutions for continuous improvement. They can use this information to

interpret their performance under the same basis of delivery structure, they also can use indicators to determine whether the results of measurement deviate from average level of hospital group under the comparison and try to intervene with them. This project was adopted to evaluate systemic change about the implementation of intervention program to improve quality of care (Kazandjian, Lawthers, Cernak, & Pipesh, 1993; Kazandjian, Wood, & Lawthers, 1995). In Taiwan, the Joint commission of Taiwan, the Accreditation organization had adopt the Maryland quality indicators projects to develop the TQIP (Taiwan Quality Indicators project), and the organization of hospital management had developed the THIS (Taiwan Healthcare Indicators series) for hospitals to improve quality of care by the trend analysis in the same organization or use benchmarking performance for comparison to conduct the action plan for quality improvement. The hospital participate in this project increased in recent years because the quality of care had become the major concern of patient of their family. The hospital in this project had established the indicators reporting system to assure the quality in hospital management and the positive outcome had been proved (Chiu, Yang, Lin, & Chu, 2007; Spaeth-Rublee, Pincus, Silvestri, & Peters, 2014)

The Patient's Bill of Right Act had been established to promise the patient's right to know the data of hospital performance as indicators about the quality of care. The transparence of report about the organization-specific performance can be used by the patient to make decision about which hospital they had more confidence to receive their

service. In addition, the disclosure of clinical data and quality measurement can be used to enhance the self-awareness about service problem of hospital to improve the service quality. HEDIS (Health Plan Employer Data and Information Set) had published the journal of Consumer to disseminate the information about medical quality of healthcare organization and emphasized the importance of patient satisfaction as the important indicators of quality of service. It advocate the utilization of patients' subjective experience as another framework for hospital management to improve healthcare quality (Schneider, Riehl, Courte-Wienecke, Eddy, & Sennett, 1999).

The consumer-centered indicators such as the patients' direct experience about the service they received was introduced to healthcare organization for further intervention of quality problems from different point of view. The patients' subjective experience about the healthcare service based on Donabedian's framework such as their perception about the process, attitude of professional and outcome of treatment was added into the objective indicators to represent the quality of care. The focus on these indicators as an important reference for continuous improvement and it was proved to be effective in improvement when successful strategic intervention conducted in hospital management (Aboshaiqah, Alonazi, & Patalagsa, 2016).

International alliance of Patient's Organization (IAPO) defined the patient is a person with any chronic disease, illness, syndrome, that had the impairment of function or reveal

disability in several life domains. The patient-centered healthcare is defined as the service with adequate response to the patients' need and the care provided with adequate evidence-based care according to clinical condition of patients. In mental healthcare and clinical practice, there are much unmet need in the care provided to the patients with severe mental illness due to their complicated condition intermixed with medical and psychosocial perspectives of problems. The service and treatment provided for the severe mental illness such as schizophrenia, bipolar mood disorder and major depression etc, the conformance rate with the evidence-based treatment guideline is lower than 20%. The main barrier about the gap existed in the specialist's attitude toward the guideline of treatment and individualized presentation of the severity and complexity of illness in these patient group. The reimbursement policy and the cost-effectiveness consideration about treatment are also the major factors influence the specialist to be compliant with the guideline. There are around 40% of patients with severe mental illness didn't receive minimally adequate treatment according to the guideline of treatment in U.S (Bohus et al., 2016; Citrome & Yeomans, 2005; Hetrick, Simmons, Thompson, & Parker, 2011; Stiles, Boothroyd, Dhont, Beiler, & Green, 2009; P. S. Wang, Demler, & Kessler, 2002). The gap between patients' expectation and clinical practice service is significant high. These information about unmeet gap of patient service resulted from inadequate compliance with treatment guideline can be collected from patients' subjective evaluation about healthcare provider. These data can be

used for hospital to implement intervention strategies to overcome the deficiency (Davis & Taylor-Vaisey, 1997).

From patients' eye to look at the quality of care, Gerteis and colleagues suggest that the healthcare provider should listen to the patients' story and treat them as the teacher to describe their experience for organization system to modify the service process. They had developed the framework to assess quality of care that integrate the patients' experience as integral element of whole system to improve in management (Gerteis, 1999). During the process of interaction between healthcare provider and patients, the major components influencing the quality perceived by patients including the interpersonal communication, emotional support provided to alleviate anxiety, and the involvement with family to share decision-making. In addition, the comfortable physical facility and caring attitude for psychological relief is associated with positive patient experience. Maintaining the continuity of care by healthcare system is also important factors influencing the quality perceived by patient. Clinic professional personnel of mental healthcare can use participation action and interaction observation to find out the problems of unmeet gap of patients' expectation to enhance the quality of care (Davison, Hauck, Martyr, & Rock, 2013; Madan et al., 2014). Patient experience can be surveyed from patients' self-report, proxy response toward composite domains and questionnaire with detail elaboration about their experience toward physical comfort, emotional support, and the delivery of clinical process. The patient as an

active participant is emphasized in healthcare practice recently, but the patient safety is still frequently omitted (Graham, 2016; Holzer & Minder, 2011; Jenkinson, Coulter, Bruster, Richards, & Chandola, 2002; Riechmann & Stahl, 2013).

2. The importance of patient safety

"To err is Human" building a safer Health system, the importance of patient safety in hospital had been declared by Institute of medicine (IOM) owing to the medical errors happened in hospital had make significant impact on the patient outcome (Anderson, Alonso, Kohn, & Black, 1994; Kohn, 2000, 2001). The chasm of medical service had increased the public awareness and created the significant pressure on healthcare organization to engage with patient safety to assure the quality of care and positive treatment outcome during the course of medical service. The Medscape that features peer-reviewed original medical articles, had advocated to adopt the rules based on clinical evidence to guide patient-clinician relationships to improve quality including continuous healing relationships, sharing knowledge, facilitate evidence-based clinical decision and build up safety healthcare system to provide safety care (Leavitt, 2001).

Vincent had defined patient safety as the absence of adverse events that are preventable

during the intervention of healthcare process (Vincent, Taylor-Adams, & Stanhope, 1998). Runciman and his colleague had develop the international classification for patient safety based on the six principles, the framework of classification can be applied across the full spectrum of healthcare, is consistent with other classification system to convey the clear meaning of patient safety. The incident of adverse events should be reported with great

clarity for the risk management in clinical setting and the term of patient safety can be used as indicators to track the trend over time for further intervention by standard procedure of improvement cycle. The framework of classification and the mutual interaction between the related factors is presented in Fig 1

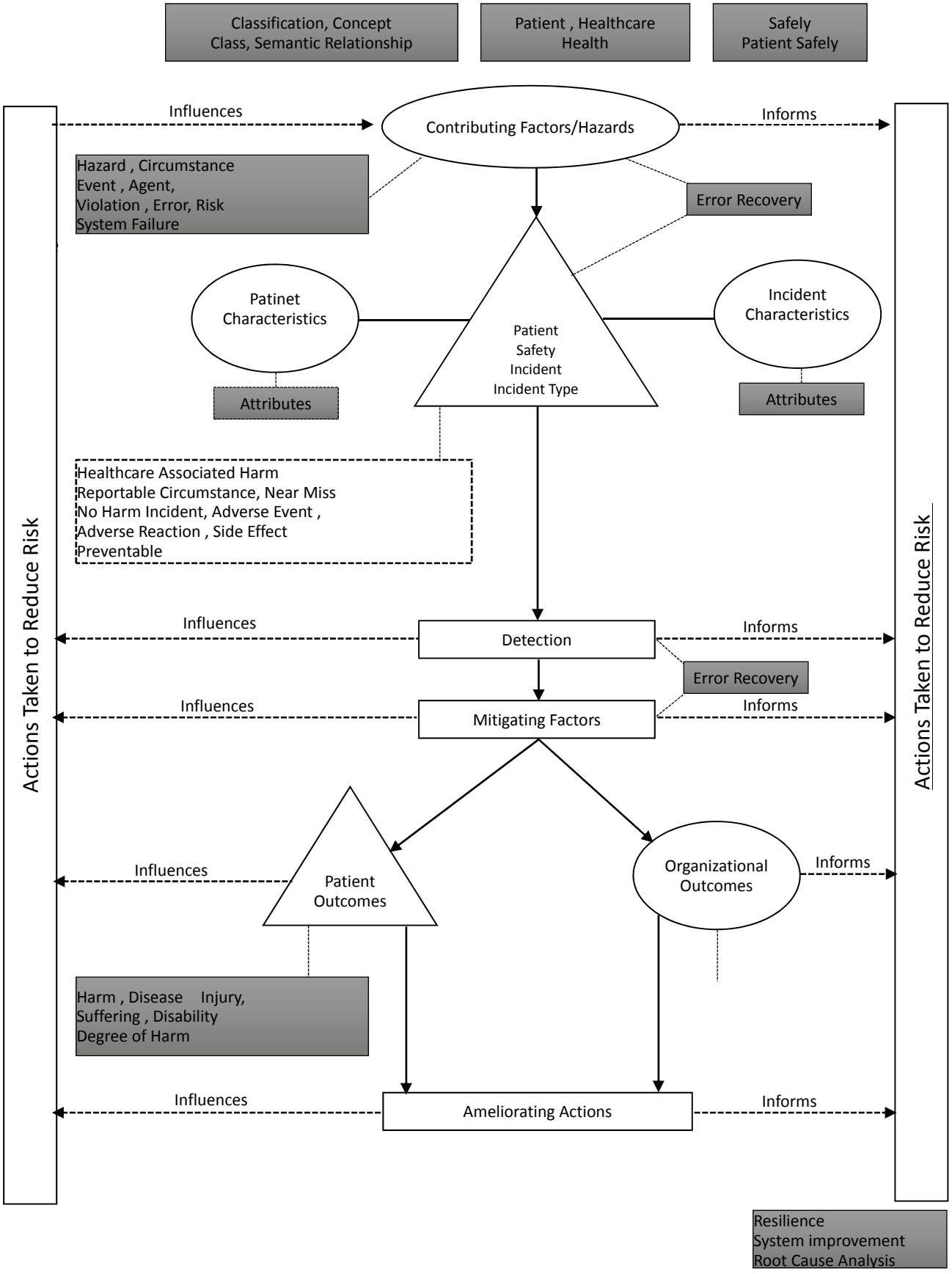

Fig 1. Concept framework for International classification of patient safety by W. Runciman et

al

The occurrence of adverse events during hospital stay will result in severe clinical consequence and increase the cost of healthcare expenditure. The basic requirement to assure the patient safety consisted of reporting, feedback and communication about errors happened. The reporting system of adverse patient safety events must integrate into clinical management system to detect the main factors that cause the errors of adverse events and to conduct the intervention strategy to prevent further happening. The discipline of improving patient safety is the non-punitive climate to face the errors of reported events, then the problems can be identify for correction in the future. The clinical process related to the adverse events must be used for detail analysis and discussion to find out the key factors resulted in the problems of patient safety and try to solve them. The cornerstone to assure the patient safety is to assume systemic thinking that focus on the point of view about the occurrence of patient safety events are resulted from a series of factors gathered together to make it happen (Gosfield, 2014; Howell et al., 2015; O'Hara et al., 2015; Riga, Vozikis, Pollalis, & Souliotis, 2015). The collected data related to the indicators of patient safety should be monitored regularly and be tracked for comparison to find out the deviance. Thereafter, the quality improvement of patient safety can be worked through by the program of PDCA (Plan, do, check and Act) cycle, RCA and FMEA that are the basic requirement of skill for clinical professional to intervene with the errors of daily practice. In daily practice, the key factors

and causes that induce the happening of adverse events can be explored and corrected by these maneuver under integrated teamwork focus on the discussion of quality issues. The programs used to improve the patient safety including accreditation, external peer review to monitor the process, internal audits on the regular daily practice. These program-level learning activity are welcomed by frontline staff to improve service outcome under system support (Mazur et al., 2015; Rivard, Parker, & Rosen, 2013; Zenlea et al., 2014). The different type of patient safety events can be used for learning, changing and improvement. The preventable events is the focus of learning and intervention, near miss event with potential harm is valuable material for team discussion. The establishment of systemic thinking is the important process to assure patient safety, the goal can be attained by the repeat monitoring about the negative events and the intervention to prevent the happening (Ginsburg, Chuang, Norton, et al., 2009; Ginsburg, Chuang, Richardson, et al., 2009).

The factors that will influence the patient safety of medical service consisted of organization culture, organization management, staff attitude and characteristic of patients. The value and belief of organization about the importance of safety issue and the weighting priority of organization on safety problems will influence the safety care significantly.

The change of organization culture toward the patient safety require broad scope of staff participation in education program and recognize the organization policy. To establish the infrastructure of organization learning culture, the leader must commit with the

management of safety environment and build up the supportive work climate for reporting of adverse events. The communication platform and system for safety intervention have been proved to be positively associated with the improvement of patient safety (Spencer, 2000; Stone, Hughes, & Dailey, 2008).

Leape and his colleague identify the fundamental endeavors to achieve meaningful improvement of safety in healthcare system from their researches. That is transparency of organization reporting data, integration of delivery care process, patient engagement with the change of service process, and the reformation of educational program for front-line staff. The constant attention to the employee education about patient safety and the establishment of adequate practical work environment demonstrate positive influence the vigor of staff to dedicate in the job. In the research of formal organizational leadership about management of patient safety such as inspiring staff and encouraging the action is an important predictors to enhance accountability to patient safety. In addition, the dissemination of information about major events to enhance the sensitivity and awareness of high-risk situation is the basis for the advanced achievement of improvement in the medical service (Leape et al., 2009; Van Bogaert, Clarke, Willems, & Mondelaers, 2013).

The enthusiasm of clinician are high to provide high quality of care, but the sustain change of organization culture to focus on the improvement of patient safety and momentum for continuous learning need long-term acculturation. The climate of working on

safety need senior leader to place high priority on patient safety as the goal of the organization management. The announcement and repeated focus on discussion of safety issue and the alignment of support resource to prevent the happening of adverse events will change the organization climate and staff's attitude toward patient safety.

Considering the role of staff, the experienced staff can foster the development of safety climate to facilitate the adequate compliance with standard procedure to maintain safety care for patients. The nurses' sensitivity about patient outcome is positively associated with safety culture and interdisciplinary communication. The quality of communication and knowledge regarding the patient safety are important factors to improve the clinical practice and patient outcome. Poor communication can lead to various negative outcome such as discontinuity of service, severe adverse events, patient dissatisfaction and inefficiency of resource utilization (Sacks et al., 2015; Vermeir et al., 2015).

The work environment with communication openness will enhance the motivation of staff to provide high-quality of care. The positive attitude to engage with the care-providing will improve when the staff satisfied with the leader support and empowerment. Especially the interdisciplinary collaboration and mutual support during the delivery of medical service process will affect the quality indicators of the perspectives of process and outcome (Morello et al., 2013). In addition, the patient can be integrated into healthcare system to

involve them in the risk protection and decision of treatment under team approach, their participation in safety issues can lead to decrease in the occurrence of adverse events (Howe, 2006; Lavallee et al., 2016).

3. The relationship between patient safety culture and patient safety

Guldenmund had conceptualize the organizational culture with multidimensional construct as a relatively stable, intangible asset of organization. The sharing value and conviction among the group member to perceive the problems and think about how to solve the problem is the infrastructure of culture (Guldenmund, 2010). Organization culture can lead clinician and staff to build up adequate behavior to focus on patient safety in working areas. The belief and normalized standard will influence the motivation of staff to engage in safe behaviors. Different aspects of hospital safety climate was demonstrated to influence the patient and worker safety outcomes in hospital setting. The supportive climate, adequate team communication and job satisfaction are proved to be major factors to influence the patient safety culture (Agnew, Flin, & Mearns, 2013).

Patient safety culture had been defined as overall behavior of individuals and organization based on belief to form the attitude toward safety care and to standardize the behavioral procedure in medical practice to reduce the incident events (Feng, Bobay, & Weiss, 2008; Sammer, Lykens, Singh, Mains, & Lackan, 2010). The establishment of safety culture can foster the development of the reporting systems and effective communication between healthcare professionals to work through barriers to enhance patient safety (Bishop & Fleming, 2014; Muralidhar, Taneja, & Ramesh, 2012). According to the previous researches, around 40% of hospital-based adverse events can be prevented, the safety

culture in the organization is positively associated with the outcome of safety promoting program in hospital (Y. Chen, McCabe, & Hyatt, 2017; Katz-Navon, Naveh, & Stern, 2007). The generalization of the weighting priority on the safety issue will shape the thinking and behavior of staff to concern the prevention of adverse event in every service process.

In many developed country, they have placed much weight to establish positive safety culture and there are many national institution to promote the movement, for example, the National Patient safety Agency in the UK, the agency for Healthcare Research and Quality in the US, and Australia Commission of Safety and Quality in Austria. They have also invent the survey tool to measure the culture of patient safety to evaluate the climate of organization and to assure the patient safety.

There are multiple questionnaire to assess the safety culture in hospital, Agency of Healthcare Research and Quality (AHRQ) had first design the HSOPSC (hospital survey on Patient safety culture) to survey the culture of patient safety. Twelve domains included in HSOPSC to assess the safety culture are teamwork across hospital department, teamwork within department, hospital handovers and transition, frequency of event reporting, non-punctive response to error, openness of communication about error, organizational learning-continuous improvement, supervisors expectations and action promoting patient safety, staffing and overall perceptions of safety. It had been translated to different language to assess the culture of patient safety and had good reliability and validity. The Taiwan

version had been used to survey the patient safety culture in different hospital with adequate reliability. From the results of researches, the response to problems of patient safety is different between different countries, for example the attitude toward reporting of errors and teamwork discussion for correction is been self-limited in oriental countries. The utilization of measurement tool to evaluate the safety culture should consider the unique perspective of different culture in different countries (I. C. Chen & Li, 2010; Farup, 2015; K. J. Jones, Skinner, Xu, Sun, & Mueller, 2008).

From EuNetPas (European Union network for patient safety) inventory, there are many questionnaire to assess patient safety culture, such as Teamwork and patient safety attitudes questionnaire, safety attitudes questionnaire, culture of safety questionnaire, checklist for assessing institutional resilience, safety climate assessment tool, and hospital culture questionnaire. These tools can be used to assess the organization culture as a reference to build up the safety environment and modify organization climate to assure patient safety (Fishman, Mehrmann, Lietz, Lessing, & Thomeczek, 2014).

Safety culture of organization is the cause and solution for further improvement of patient safety. Organizational culture that encourages reporting and avoid blaming are the basic infrastructure to assure patient safety (Spencer Laschinger, H., et al 2009). The adoption of improvement cycle of PDCA will improve communication between team members that are reported as important factors to improve patient safety culture. The

patient safety culture in healthcare organization can be predicted and influenced by communication with mutual trust, good information flow, and organizational learning. The leader commit to establish the belief in the value of patient safety and quality, and guide the professional peer to model the behavior during cooperation is most important factors to concrete culture of quality and safety (Nygren et al., 2013; Wakefield, McLaws, Whitby, & Patton, 2010).

In the clinical process, the patient outcome is the product of medical care delivered by many health professionals cooperated across multiple work areas. Team behaviors consisted of leadership, information sharing, group decision making and execution of project. The support of senior manager can enhance the motivation of team member to engage with the teamwork and the improve cohesion. The communication pattern of professional and the commitment of staff will influence the effectiveness of inter-professional work within the team and the innovation for continuous improvement. (Chatalalsingh & Reeves, 2014; Molyneux, 2001; Weaver et al., 2010). Well-coordination of team member can prevent the adverse events, can reduce the inter-professional strain and enhance psychological well-being of staff. The positive perception of teamwork is positively associated with organizational climate and safety performance that can promote the quality of care. In the research of Taiwan hospital, teamwork climate is the most important determinant about with the nurse's attitude toward patient safety (Kristensen et al., 2015; Li, 2013; Munoz-Seco,

Coll-Benejam, Torrent-Quetglas, & Linares-Pou, 2006).

Ineffective team communication and negative interpersonal teamwork will display incongruity in the working place and impact the role function of staff during medical process. These conditions will increase the burnout rate of professional that resulted in the negative influence on the patient safety and quality of care. If physicians and nurses dissatisfied with the quality of teamwork in the units will experience more emotional exhaustion and the adverse events will increase. The burnout rate can be reduced by the respectful social encounters during dynamic interaction between team members. The relief of conflict by effective communication will lead the reduction of adverse event related to patient safety (Maslach & Leiter, 2008; Maslach, Schaufeli, & Leiter, 2001). In addition, team resource management is proved to be an effective tool to enhance communication between team members and appear beneficial to team cooperation that can enhance quality of care (Maynard, Marshall, & Dean, 2012).

The organization change is an evolution process, it depend on the accumulation of sustain implementation of project for changing the process and the active leaning from flourish environment and education program (Odwazny, Hasler, Abrams, & McNutt, 2005; Wong, Helsinger, & Petry, 2002). Effective intervention strategies to motivate the behavioral change and build up safety culture is rooted in principle of leadership, teamwork pattern, and advanced learning culture (Parmelli et al., 2011).

The supervisor's executive walk-round to engage directly with front –line care provider, commit them into dialogue will foster trust. During the interaction, adequate support from supervisor will enhance the self-awareness of safety problems and active correction of the reported errors. The involvement with the micro-system problems can lead optimize teamwork communication process and collaboration (Thomas, Sexton, Neilands, Frankel, & Helmreich, 2005). The commitment of senior leader with the front-line staff to solve the underlying systemic causes of medical errors will enhance the motivation of staff to change their attitude toward the safety care. The human resource management to establish incentive and reward to engage the staff participate in education program can enhance their recognition of the value of organization. The leader can employ the daily practice activity as safety transcript for further discussion to manage the obstacles of team coordination (Adibi, Khalesi, Ravaghi, Jafari, & Jeddian, 2012; Yates et al., 2005).

Utilization of scenario within team training program as intervention strategies is proved to be effective to modify the cognition and affective response of team member toward the safety events. Eight principles were suggested by Salas et al to enhance team work including identify the teamwork competence, redesign the working process, provide guidance for desired outcome and use simulation to ensure the relevance of intervention, provide feedback to reinforce the desired teamwork behavior (Salas, DiazGranados, Klein, et al., 2008; Salas, DiazGranados, Weaver, & King, 2008). The observation of clinical situation

and inductive analysis about the collected data can be used for reflection on the errors to deepen the inter-professional learning and team coordination.

The medical errors and physician's failure to follow the evidence-based guidance will expose the patient to the potential ham. CUSP, the comprehensive unit-based safety program that translate the evidence into practice is the best way to take the advantage of wisdom from daily practice to create the individualized solution of patient safety problems. It can be used in hospital level as the system-focused safety program for behavioral changes and culture building. During the process of the program, team members are encouraged to learn from identification of characteristic problems in the team working to modify the process. The CUSP is significant associated with the change of care process, can reduce patient harm and burnout rate of clinical professional. The adverse events decreased 37% after implementation of CUSP team training program (Romig, Goeschel, Pronovost, & Berenholtz, 2010).

The individual values, beliefs and behaviors will be acculturated into organization system over time through the dialogue and sharing knowledge within the unit to concrete the norm of organization (Morello et al., 2013; ojalehto & Medin, 2015). The workshop training including the concept of patient safety, nature of human errors and the preventive intervention can instill the thought pattern for staff to intervene the problems of patient safety. The continuous on-job training about patient safety that employee receive is benefit

to build up positive safety culture.

After the course of training and acculturation of belief on the patient safety under intensive hospital management, the quality of care and patient safety will improved. In the same time the satisfaction of employee and their organization commitment will increase, these changes will improve the service quality and patient satisfaction (Andaleeb & Kara, 2013).

4. Culture, employee job satisfaction and service quality

Employees are the most important assets of organization. The employee that are satisfied with their job will be more productive and increased willing to stay on the job, the dissatisfied employee will give negative impact on the customer service and influence the integrity of organization culture. The establishment of safety climate and atmosphere of continuous learning culture can enhance the vitality of staff and their engagement to create the organization future. The human resource management program focus on the improvement of employee satisfaction can modify the organization outcome and financial growth. The psychological well-being of employee can predict the high job performance and decreased cost of human resource (Hall, 1998; O'Brien, 2006; Spreitzer & Porath, 2012; Vermeeren et al., 2014; Wright & Cropanzano, 2000). According to NICE guidance, organization leader should commit to the agenda to take care of the mental health of employee and take as indicators for regular monitor to enhance the accomplishment of organization value (S. Jones, Coggon, Ntani, & Williams, 2015).

Job satisfaction of employee is defined as global emotional experience about the job and their attitude about arrangement of the work, it is a multifaceted construct related to pay, work condition, training and supervision, opportunities for professional growth, relationship with co-worker, and achievement from job. The domains related to the employee satisfaction can be assessed including the perspectives about the interaction with

co-worker, external rewards, control over work, working environment and professional participation (Misener, Haddock, Gleaton, & Abu Ajamieh, 1996).

Herzberg had identified hygiene and motivating factors to form two-factors theory related to people's perception about the work. The hygiene factors including salary, warfare and benefit, organizational policy, working condition and supervision are related to job dissatisfaction; the motivation factors consisted of achievement, recognition, promotion, responsibility and whether work itself is motivation promoter are related to job satisfaction (Ewen, Smith, Hulin, & Locke, 1966; Graen, 1966). Based on the researches and theory, the job satisfaction will increase if organization climate could provide more opportunity for personal growth and achievement.

The satisfaction with the job is positively correlated with the organization commitment that is defined as individual's strong belief about the organization goals, willingness to pay effort and involve with the task to achieve the goal. The motivation to achieve personal growth and a strong desire to maintain as a membership in organization determine the working attitude and behaviors on job. The role clarity and self-efficacy mediate the effect of socialization in organization and enhance their participation in the organizational development. Perceived leader support and psychological empowerment on job strengthen the positive working experience and increase performance on the job (Battistelli, Galletta, Portoghese, & Vandenberghe, 2013; Bauer, Bodner, Erdogan, Truxillo, &

Tucker, 2007; Seibert, Wang, & Courtright, 2011).

The strong commitment with organization will contribute to high employee loyalty, increased effectiveness of work performance and lead to increase in productivity. It also reduces absenteeism from work and turnover rate. The enhancement of team cohesion and adequate management of job strain are important factors influencing the employee satisfaction. The contribution had been recognized and perceived control on the job will influence the intention of nurse to stay time in the hospital (Anton, 2009; De Gieter, Hofmans, & Pepermans, 2011; Nei, Snyder, & Litwiller, 2015).

The job satisfaction, organization commitment and productivity of employee can be explained by the leadership style identified by Kouzes and Posner to management the task force. When leader inspire employee to recognize the organization vision and challenge the task of employee will enhance them engage with task. The employee had more autonomy on job and had more opportunities to participate in making decision will improve the mental health of employee and job satisfaction (Chiok Foong Loke, 2001).

From the research about nurse job satisfaction and commitment with job revealed that it is related with trust relationship with supervisor, the empowerment feeling of employee, rewarding working climate and transaction leadership (Cicolini, Comparcini, & Simonetti, 2014; J. Yang, Liu, Chen, & Pan, 2014)

Considering the Maslow theory, he had constructed five-level structure about

people's drive to self-actualization in career development. In his framework, people will search for high-level satisfaction when he felt satisfied with lower level need. The people will step for accomplishment from physiological need, safety, love and esteem to self-actualization. The intrinsic reward and growth from work in organization is the most important driver for employee to achieve self-actualization and satisfaction (Taormina & Gao, 2013; Zalenski & Raspa, 2006).

From the point of view of internal marketing, employee is most important internal customer. During the process of organization acculturation, organization citizenship behavior (OCB) will be emerged and motivate for further organization development. The OCB consisted of altruism, conscientiousness, civic virtue, and courtesy. The positive OCB will lead to decrease absenteeism, reduced turnover rate, and enhance the employee's loyalty to organization. The altruism and conscientiousness in OCB may improve satisfaction of employee. The ethic climate of organization such as core value of respect personal right, follow the code and rule, and fairness of welfare program in working environment will enhance job satisfaction. The focus of the hospital management on the professional growth of employee and positive organization behavior during the shaping of organization culture is important to enhance employee satisfaction and service quality (C. C. Huang, You, & Tsai, 2012; Talachi, Gorji, & Boerhannoeddin, 2014; Tsai & Wu, 2010).

Employee satisfaction is an antecedent of service quality, the positive attitude toward

job to make customer perceive enduring experience about service that will predict the customer satisfaction. Organization culture such as authentic communication and team-coordinated activity to provide service for patient is important factors to enhance job satisfaction and enhance the perceived quality by patients in the same time. The transmission of vision and core value to employee and invite them to involve with organization development will enhance employee satisfaction and service quality (Clark, Wolosin, & Gavran, 2006; Dong, Liao, Chuang, Zhou, & Campbell, 2015; Jackson & Wood, 2010; Scotti, Harmon, & Behson, 2007).

In the changing healthcare environment, the employee satisfaction is positively correlated to patient satisfaction. Physician attitude toward the job will influence the prescribing behavior and patient compliance with the treatment. The satisfaction of physician about job will enhance their engagement with the patient treatment and enhance the care quality. The satisfaction of nursing staff have the same effect and will influence the quality of clinical practice. The perceived quality of care by patients is positive with nurse satisfaction. The patient felt better care from nurse and they perceived more respect to their need from nurse due to the positive response to their need. The well-organized of working activity and the alignment of job resource can improve quality of treatment, patient satisfaction and job satisfaction of employee (Kvist, Voutilainen, Mantynen, & Vehvilainen-Julkunen, 2014; Mache, Vitzthum, Klapp, & Groneberg, 2012; Spence Laschinger

& Fida, 2015). The hospital management focus on these factors will activate the value chain to enhance positive outcome and success of goal attainment.

Employee satisfaction can be surveyed by the different domains according to the research purpose and studied population. The measurement of satisfaction about work environment, salary and promotion, personal growth and relationship with co-worker is very common. The measurement of the intrinsic satisfaction and extrinsic satisfaction can be designed based on the theory or assumption on job satisfaction. The validity and reliability should be examined and confirmed. There are several questionnaires such as Minnesota satisfaction Questionnaire, Job Satisfaction Index that can be used for the survey about the employee satisfaction (de la Cour, 1992; Labiris, Gitona, Drosou, & Niakas, 2008; Pezaro, Clyne, & Fulton, 2017).

The employee satisfaction is the infrastructure for the development of organization culture and the moving force for continuous improvement to enhance the service quality to meet the patients' expectation. It must be concerned and place more weight in hospital management to attain the mission of organization. In the same time, the patient satisfaction will be enhanced when employee engage with the service quality enthusiastically.

5. Patient perspective about quality of care

Patient satisfaction is the major outcome measure of successful management, the higher the patient satisfaction with medical service, their loyalty to hospital and willing to return back to the hospital increased. Customer satisfaction is the process of cumulative evaluation about experience in healthcare organization and is the consequence of perceived service quality. The hospital quality management system focus on the patient-center care and the patient involvement with service process are the predictors to patients' positive experience in hospital (Groene et al., 2015). Kersnik emphasize the importance that focus on consumer satisfaction will improve organizational performance. The continuous quality improvement to provide sustained consumer satisfaction has become an important component of quality of care (Kersnik, 2001).

It is important to pay more attention to the patients' need and preference to attain high quality of service and maintain effective service outcome of healthcare. The patient satisfaction is the important outcome indicator that was used in healthcare organization to monitor the quality of care and it is critical to develop benchmarking goal for improvement in service quality. The valid instrument should be used to monitor this quality indicator to implement strategies to improve quality (Merkouris, Ifantopoulos, Lanara, & Lemonidou, 1999; Westbrook, 1993; Yellen, Davis, & Ricard, 2002). The patient satisfaction about the service is also the important mediators and key determinant to enhance hospital profitability,

so it is frequently used as indicator of organization strategic management to improve financial outcome (Baker & Taylor, 1997).

Patient satisfaction is defined as patients' cognitive perspective and emotional experience toward the clinical process during the service, is a multi-dimensional construct related to the patients' expectation, value and experience. It can represent as the outcome directly attributed to the healthcare efforts and service process been experienced. It can be evaluated and judged according to the gap between the expectation and realistic experience. According to the Parasuraman research, the structure of patient satisfaction is determined by the reliability, competency, responsibility, empathy, communication and tangibles physical facility during the delivery of medical process. The fulfilment of patients' expectation during service and their positive experience with doctors' service are related to overall patient satisfaction. The doctor-patient interaction and direct orientation to treatment are major component to influence patient satisfaction. The physician communicate with expertise and provide service-related information with professional competency are all involved with the enhancement of patient satisfaction. In the parts of interaction and communication, it is related to physician conduct. The warm and caring attitude toward the patients' distress and empathetic behavior are the major component to enhance patient satisfaction (Bjertnaes, Sjetne, & Iversen, 2012; Graugaard, Holgersen, Eide, & Finset, 2005; Hekkert, Cihangir, Kleefstra, van den Berg, & Kool, 2009; Van Den Assem & Dulewicz, 2015).

The convenience of access to service and the cost from service will influence the global impression about service system. The integration of care provided under individualized patient-centered service and the efficiency of service are all important factors influence the patient satisfaction. The perceived service quality that associated with value perception from supreme experience during the process of healthcare service will influence patient satisfaction and their behavioral intentions, so the service quality is critical factors for organization advancement in competitive market to take advantage for growth (Bosko & Wilson, 2016; Mohamed & Azizan, 2015).

According to the researches about patient satisfaction, the younger, less educated, lower ranking, married, poor health status and high service user is associated with lower satisfaction. Patient satisfaction can lead to patient retention and loyalty toward the service, this will improve the compliance with physician advice and treatment outcome, followed by improvement of treatment outcome. The switching behavior of patient to another healthcare service is influenced by price, inconvenience, core service failure, inadequate response to ethical problems, and inadequate patient satisfaction. So how to invent the program to satisfy patient's need, especially toward the low-satisfaction-level population is an important indicator in the management of healthcare organization (Chang, Chen, & Lan, 2013; Moller-Leimkuhler, Dunkel, & Muller, 2002; Omer, Cockcroft, & Andersson, 2011)

The survey and measurement of patient satisfaction can be evaluated by qualitative

method such as direct observation, focus group interview, and quantitative method by use of questionnaire such as patient satisfaction questionnaire,(PSQ); client satisfaction questionnaire,(CSQ);patient satisfaction scale(PSS); medical interview satisfaction scale,(MISS). A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality (SERVQUAL) based on Parasuraman theory is a useful tool to assess patient satisfaction under the construct to evaluate the comparison between the patients' expectation and real experience (Archer & McAvoy, 2011; Bredart et al., 2002; Revicki, Hays, Cella, & Sloan, 2008)

To enhance the quality of care, we should pay more attention to the parts of dissatisfaction from the survey of patient's perception toward the service, that will activate the healthcare organization to engage with more advanced intervention to improve the service quality.

6. Balance scorecard as an effective tool for strategic management

To enhance the quality of care, many hospitals had adopt the tools such as QC (quality control), TQM (Total Quality Management) to manage the medical problems to enhance quality of care. During these activities of quality management, it should involve the team that provide medical service to focus on the deviance from standard process to improve the quality. Most of these activities try to find out the related factor with the deviance happened in daily practice, and to correct it. The clinical team clarify the major factors caused to the deviance and solve the problems based on the analysis of the data. The cause and effect analysis such fishbone chart is used to define the major factors in the domains of people, process, and facility to identify the key factors induced the problems. The team members must participate in the discussion and engage with the conductance of intervention strategies, then to check the outcome of the intervention, thereafter to establish the standardized process if intervention strategies are proved to be effective.

Quality improvement activities had become the important issues in hospital management and increased in application to solve problems rapidly since 2000. Many hospitals had implemented different kind of QI activities to solve their problems and to improve the quality of care. The hospital management should face the external factors such as the higher expectation of patients about the medical service, social movement to advocate for the personal right, the competition in healthcare service market, and the

pressure from the third party. The leader should commit the value-based principle to direct the strategy for continuous improvement and financial growth by the utilization of available resource based on the characteristic of organization structure. Therefore, the quality indicators system is used as a tool to measure the quality of care and continuous improvement in hospital management.

During the quality improvement cycle, the healthcare organization must engage with the analysis, diagnosis of problems and set up the plan to solve the problems to improve the quality of care step by step. There are many methods can be used to improve the quality of care in daily practice such as QCC, TQM, and RCA. In addition, the set of benchmarking indicators can be used as driver for continuous improvement systemically (Kissling, Seemann, & Piwernetz, 2001; Rago & Reid, 1991; Sonntag & Koch, 2012; Wand, Isobel, & Derrick, 2015).

The outcome of hospital quality improvement (QI) is related to leadership commitment, organization culture, interdisciplinary coordination and adequate supportive resource, but little evidence about the effectiveness was established (Shojania & Grimshaw, 2005). In recent years, balanced scorecard (BSC) management had been used as principal structure to involve all staff to improve process and to attain the strategic goal of organization (Mills & Spencer, 2005).

According to the statement of Alfred Chandler, the strategy is the adoption of courses

of action and associated allocation of resources required to achieve the goals following the direction of organization (Chandler, Alfred. 1962).

Balanced scorecard (BSC) is a tool for strategic management, it can translate the organization vision, value and strategies into key performance measurement for implementation of strategic plan to attain the goal of organization(Kaplan & Norton, 1992). The framework of BSC is a multidimensional construct that used to create strategy map to link objective, initiatives and target to execution of the action plan to achieve financial and non-financial goal. The measurement indicators of action plan in different perspectives are selected to regulate the process of improvement follow the definite structure to organize the composite indicators for final financial growth (Weber, 1999).

The framework of balanced scored card (BSC) was developed by Kaplan and Norton to reach the strategic goal with well-connected of four perspectives resulted from the experiment in 12 Business Company since 1992 (Kaplan, R.S. and D.P. Norton. 1992). BSC had been proved to be an effective tool to transform the organization step by step to become an energetic system to look forward the continuous growth. It can visualize the strategic map to illustrate the task-orientated plan with clear executive language and it can demonstrate the structure about how to tie the job with strategy, then facilitate the process executed in an integrate framework for financial growth. Based on the framework of BSC management, the leader should communicate with all staff to establish the strategic plan to

achieve the organization‘s mission based on the core value. From the perspective of learning, it can activate the human resource capital and intangible asset to build up the strategic readiness for further development, it is the first step to initiate for the change and improvement (S. N. Inamdar, Kaplan, Jones, & Menitoff, 2000; Kaplan & Norton, 2000).

There are four perspective contained in BSC framework, the financial perspective emphasize the asset utilization and efficacy; the customer perspective focus on the patient flow ,market share and patient satisfaction about the service; the internal process perspective focus on the measurement of quality and the outcome of program; and the perspective of learning and growth is to measure the effectiveness of human resource utilization and the change of organization culture(Kaplan & Norton, 2006, 2008)

To implement the BSC management system, the SWOT analysis should be done to identify the strength and weakness of organization. Thereafter the operational plan and strategic goal will be developed, then followed by the regular monitoring and assessment of the progress of strategic plan to correct the deviance from the goal. During the process, identification of the barrier and sharing of information is the basic requirement for systemic change and growth. (Forgione, 1997; Kaplan & Norton, 1992).

The structure of BSC and its meaning is to balance between the short-term and long-term objectives, it can connect the progress between the financial and non-financial measures, and it also can use the leading and lagging indicators to monitor the progress of

strategic plan. The performance outcome of leading indicators will influence the lagging outcome of next year. Based on the research, the utilization of leading indicators will lead the positive growth of financial outcome (Gao & Gurd, 2015; Gumbus & Lussier, 2003). This framework can integrate different department to focus on the promotion of health of patient and wellness, can enhance the customer-driven service, and can guide the employee to change the value system of organization. The implementation of BSC can modulate the efficiency of operation and reduce cost, it can increase patient satisfaction and maximize revenues; in addition, it can enhance employee growth and satisfaction in working system. The framework of BSC management can be used to organize the whole system to commit the benchmarking goal and continuous improvement with holistic approach to the change of organization. The more weighting that are placed on the perspective of process and leaning, especially focus on the quality perspective will increase the growth of financial outcome (Bouland, Fink, & Fontanesi, 2011; Macdonald, 1998).

The strategic objective and performance measurement in BSC framework can be divide into different hierarchy for the participating staff to invent the operation plan to actualize the vision. It is different from traditional approach to direct the organization change, the BSC management system can increase organization awareness and enhance accountability of staff toward the transformation of system. Learning organization and innovation capabilities for continuous evolving of value process is the infrastructure to

energize the employee to fulfill unmet customer need in service. The establishment of cause and effect relationship between key performance indicator and comprehensive design of strategic map can increase annual revenue by adequate arrangement of BSC executive plan. BSC management can lead to the development of consensus in organization to follow the ethic principle and to make the value-based decision for quality improvement (Chow, Ganulin, Teknika, Haddad, & Williamson, 1998; Higginbotham & Church, 2012; Lupi et al., 2011; Mills & Spencer, 2005; Tsasis & Harber, 2008)

Kaplan and Norton declare the principle of BSC should translate the strategy to executive language to measure the performance outcome according to the scale of organization and their major movement in specific enterprise. There is no different of effectiveness to apply the quality management tool in different maturity of organization. The four perspectives can be modified to focus on the major components of organization practice activities in different domains. In the MHSIP, the indicators had been designed to assess the following areas such as access, appropriateness and quality, outcome of intervention, social participation and promotion of mental health. Zelman et al point out that it is necessary to modify the BSC to fit industry and organization realities (Zelman, W.N., et al 2003).

The strength of BSC implementation can relocate the strategy resource on the customer's preference and to remodel the structure of core process. During the process of

implementation, leader should commit to communicate with employee to add value in the service system, and spent more time to the part of potential opportunity and threat to handle the challenge. It also should integrate effectiveness and efficiency of service process to meet the customer's need. In healthcare organization, quality issues and social responsibility are suggested to pay more effort to manage for success (Demartini & Trucco, 2017; Edward et al., 2011; Groene, Brandt, Schmidt, & Moeller, 2009)

To achieving the vision of health care organization, emphasis should be focus on the outcome and process under the comprehensive analysis of related information. BSC had been proved to be an adequate tool to identify the barrier and facilitators for health facility to improve the performance. The barrier is lying on the resistance to the change of employee and inadequate connection between the incentive and task performance. The major facilitators for success is come from the consensus and effective teamwork. The integration of strategy into organization to direct the feedback from customer's perspective and to focus on team collaborate is effective for continuous improvement. It also can be used as the research method to measure the quality of care and the outcome of complicated intervention (Bilkhu-Thompson, 2003; Bisbe & Barrubes, 2012; N. Inamdar, Kaplan, & Bower, 2002).

The integrative approach to performance evaluation by the utilization of BSC framework should have been worked through three stage. First step, we should focus on the

content of BSC initially, then focus on the strategy, last is to introduce specific targets and connected cause-and- effect between action plan and the strategy. In the same time, to design the construct of four perspectives and performance measurement system to achieve the strategic goal. Oliveira had suggested the following procedures to implement the BSC program (Oliveira, 2001).

Implement of BSC structure could be designed into following stages:

1. Build up the awareness of the importance of organization change.
2. Self-assessment and analysis of environment to generate the representative strategies and weighting prioritize for improvement.
3. Engage organization staff to establish consensus to change.
4. Brainstorming the strategic goal and Identify key performance indicators and successful factors.
5. Determine the cause-effect relationship between Key performance indicators to explain the results of action plan.
6. Implement the strategic action plan and monitoring system.
7. Regular meeting to correct the deviant and to innovate of process.

BSC management was introduced into the healthcare system to achieve successful outcome since 1992, the positive growth in the indicators of different perspectives in ST. Mary's Duluth Clinic Health system, and Mayo clinic were established. In Mayo clinic, the

utilization of key performance indicator such as patient satisfaction, productivity of clinical service and efficiency to reengineer the internal process. Thereafter, the individualized service for different patient type increased, and the social commitment and successful achievement of strategic goal was attained after implementation of BSC management (Curtright, Stolp-Smith, & Edell, 2000; Gumbus & Lussier, 2003).

In the practice of BSC management in Duke children hospital, patients satisfaction increased 18%, average number of days of hospitalization increased and readmission rate decreased, the hospital cost decreased significantly. Finally ,the satisfaction of team member and manager increased after the conductance of BSC management (Meliones et al., 2008).

In Canada, the BSC management is collaborated with research team to develop meaningful indicators of performance for system integration and change. In Ontario Hospital, there are a many initiatives to develop inpatient scorecards for acute, emergency, rehabilitation and continuing care of patient with complicated diagnosis. The indicators were modified as grow, balance, infrastructure and performance in the framework of BSC to increase patient flow and financial outcome according to population they served. The focus on the quality indicators (Kocakulah & Austill, 2007; Pink et al., 2001).

BSC management can be used to demonstrate the positive response to the change of service population in public health to improve well-being of people. And it was used to enhance patient safety, operation quality, innovation and research outcome and it was

proved to be effectiveness on the major outcome of quality of care resulted from the integration of key indicators between four perspectives. Through close alignment of the performance indicators, accompanied with valid, comprehensive and timely information, added by the comparison with local and international benchmark, BSC management can lead upgrade the medical quality and patient safety (Pink, Slifkin, Coburn, & Gale, 2004; Zelman, Pink, & Matthias, 2003).

The successes of scorecard integration have been reported in the Dutch and Italian public health care systems to improve the population health. Publications reported that the hospital in Pakistan, the modification of program to establish successful management of health problems in national public health systems is found (McLaughlin, 2014; Nippak, Veracion, Muia, Ikeda-Douglas, & Isaac, 2016).

BSC can be modified into different level of healthcare system to solve the healthcare problems. In low-income countries and low resource setting, BSC had been used to focus on improving the treatment outcome of people with mental illness in primary care. In medium resource setting, it can be used in global mental health, outpatient clinics, community mental health, and acute in-patient services. In high resources setting, it can be used for specialized services and comprehensive quality improvement. The successful improvement of results is attained with adequate arrangement of perspective and connection of indicators. The World Health Organization has recently recommended the use of balanced scorecard in

monitoring and evaluation of the health system to build up the infrastructure for further development (Impagliazzo, Ippolito, & Zoccoli, 2009; Villalbi et al., 2007; Zbinden, 2002).

To invent the strategies to maximize the strength of organization and manage the internal weakness and threat according to the SWOT analysis, the utilization of prospector strategy can lead to best performance outcome. The prospector strategy is primary focus on the quality of product and innovation of process, high quality of service will attract more customer and raise patient satisfaction to enhance the financial growth. The continuous focus on the customer perspective and learning process had positive influence on the financial outcome. The utilization of leading indicators will improve the performance outcome, especially focus on the indicators related to the quality and safety (Alolah, Stewart, Panuwatwanich, & Mohamed, 2014; Behrouzi, Shaharoun, & Ma'aram, 2014). The continuous maintenance of the structure of BSC and selection of adequate indicators are the major successful factors to attain the goal of organization.

The reporting system, regular audit and monitoring of indicators, invention of intervention strategies to correct the deviance is the major component to improve patient safety, these process is the same as the basic structure BSC to conduct the action plan. According to the review of study the effect of BSC, most of them suggest the important focus on the quality improvement in the perspective of internal process. The framework of BSC management has been used in many hospital, different department such ICU, internal

medicine, surgery, nursing, pharmacy etc to attain the goal of improving quality and maintaining the patient safety. It was proved to be effectiveness in the improving patient safety resulted from systemic change including the establishment of the incident reporting, change of guideline and documentation, change of policy, and organization learning after the conductance of BSC management (Charbon & Oyon, 2001; Luttman, 1998; Stavropoulou, Doherty, & Tosey, 2015; Yeh & Lai, 2015).

From the systemic review, the influence on quality of care and patient safety, the manager activity is very important, the time allocate to the quality issue in the Board meeting and weight the value on the patient safety. The implement of strategies of public reporting of quality data, establish goal and strategy to improve quality care, and the management team commitment with the quality issues are the major activity in BSC framework to assure the patient safety. The indicators can be selected from the event with high frequency and high severity of injury to manage according to the characteristic of healthcare organization (Wells & Weiner, 2005).

The composite indicators of patient safety can be designed in the BSC management for further improvement. The advantage of composite indicators consist of summarize complex issue to single structure for decision making in practice service. Then the indicators can be used in the framework of BSC management to facilitate communication in the teamwork and induce innovation in quality improvement. Under the sustain conductance of BSC

management, the systemic change of organization to pay more attention to the continuous improvement of process to assure the patient safety. The project of Maryland indicators project and TCPI project in Taiwan can be used as composite indicators for improving quality and assurance of patient safety. The participation of TQIP system, the medical resource should be enhance, and the efficiency of technique support and coordination of human resource will enhance, then the quality and productivity increased after the participation in the TQIP system. The effectiveness is resulted from close follow-up of the progression of indicators change and the continuous improvement cycle. The effectiveness is more significant in private hospital than public hospital (H. F. Chen, Hou, & Chang, 2012; M. C. Yang & Tung, 2006).

In the quality management demonstrated in the integrated system strived for excellence including following core values of principle to assure patient safety: focus on strategy, systemic view, goal-oriented, quality-driven, customer-centered, learning-based, people-led and balance of measurement. These core factors for excellence are similar with the execution of action plan to improve the quality in the framework of BSC management. In psychiatric hospital, the quality of care and patient safety can be synthesized into the indicators system that coordinated to be intervened by the implement of strategic plan to manage the risk factors for happening of adverse events. For example, in Ontario hospital system, it can be used in the department of additional, general psychiatry to improve the

quality of care (Lin & Durbin, 2008; Lupi et al., 2011).

The leader commit with the communication to invite the participation of staff to enhance the identification of organization policy and loyalty is the infrastructure to succeed. In addition, the social responsibility and patient safety should be added in the perspective to assure the medical quality. The regional hospital has good performance on the social responsibility, local hospital is weakness in the patient safety. The psychiatric hospital is good in the perspective of internal process, but weakness in customer perspective. After continuous conductance of action plan to achieve the goal with internal reward from achievement, the positive satisfaction of employee and patient will increase. Then the change of organization culture will follow (Millar, Mannion, Freeman, & Davies, 2013; Mosadeghrad, 2013; Ramsay et al., 2014).

In a highly competitive environment, healthcare organization always faced the challenge to improving the financial performance, and is expected to provide high quality service for patients. Application of BSC management in the complex health system or academic health center, the positive change is found in the domain of resource coordination and cost constraint. In addition, the domain of education and training, and health information management also improved. The central role of BSC management in healthcare organization is to identify barrier and facilitators from systemic information collection to improved decision making for value-added service and quality improvement (Higginbotham

& Church, 2012; Khan, Hotchkiss, Dmytraczenko, & Zunaid Ahsan, 2013; Pink et al., 2001; Shoemaker & Fischer, 2011).

According to the research, the major problem during the implementation of strategy in business company and healthcare organization as following: inadequate distribution of resource, inadequate management style, use top-down communication, unclear strategic weighting of goal and indication selection, inadequate direction of population need, ineffective management and conflict priority, weak linking between different perspectives, and inadequate participation of employee and resistance to the execution of intervention plan(Schmidt, Bateman, Breinlinger-O'Reilly, & Smith, 2006; Weir, d'Entremont, Stalker, Kurji, & Robinson, 2009)

The difficult in implementation of BSC as follow: difficulty to understand the cause relationship in different perspectives, difficulty to integrate resource and formation of consensus, employee' resistance to been evaluated, difficulty in setting up informatics system to collect data for analysis, and didn't know how to select the key performance indicators to measure the core service. To attain the success of BSC management, it require sound mechanism of direct communicate to facilitate mutual understanding of the strategic goal. The most important principles to attain success, it should involve all employee to incorporate the action plan to meet the disparate demand of each patient group. During the process, the double-loop communication must be established to deal with the resource

allocation in different departments. The consensus of staff from different departments will engender the culture change and the development of organization learning for continuous growth. The engagement of middle level of manager is very important during the process of conductance, it should be flexible to keep attention on organization's critical strategic objectives for success and to lead specific action to achieve the progress in delivery of high-quality of care in the coordination of different perspectives (Chambers, 2002; Goree, 2002; Griffith, Alexander, & Jelinek, 2002; M. L. Jones, Filip, Smith, & Remsburg-Bell, 2002).

The weakness of BSC management consist of lack of emphasis on employee perspective, inadequate consideration between cost and quality, focus on the perspective of control rather than enhance commitment. But other author had assume different opinion, they think that the framework of BSC has positive effectiveness on the above-mentioned perspectives. Quinn et al had invented the competing values framework that emphasized on the competition, control, collaborate and creation could compensate the weakness of BSC framework (Wicks & St Clair, 2007).

The BSC management had been widely used in different scale of hospital in Taiwan. The employee can accept the framework of BSC applied in organization to enhance efficiency and productivity. The principal difficulty faced in the implementation of BSC management is that the performance indicators are not easy to set up and lack of adequate manpower to actualize the goal. After the implementation of BSC management, most of goal

and performance indicators are not achieved adequately, the failure maybe due to insufficiency supportive system and lack of adequate training to conduct the structure of BSC logically. Even the above-mentioned problems, most of them recognize that the weakness of organization is improved after implementation of BSC management, and the cohesion of team improved. The recommendation about how to make BSC successful in hospital management for growth is that the leader commitment with the goal and the motivation of employee to participate in the action plan. In addition, the reward system must be connected to the executive framework, and the continuous education program and friendly informatics system should be established. The positive improvement of organization can be attained by the BSC management, but the work loading from execution of action plan will inflict the distress on the employee. The balance of performance indicators in different perspectives and the clear priority of goal following the value and mission of organization is important to be abided during the process of implementation and transformation of organization (H. F. Chen et al., 2012; Chu, Wang, & Dai, 2009; S. H. Huang, Chen, Yang, Chang, & Lee, 2004; Wu & Kuo, 2012; M. C. Yang & Tung, 2006; Yeh & Lai, 2015).

In this study, we try to exam the effectiveness of BSC management on the change of key performance measures in four perspectives and to understand the successful factors in the BSC structure to achieve the strategic goal of organization.

Chapter Three: Hypothesis and research method

1. Framework of research theme.

In the management of healthcare organization to attain the strategic goal, BSC framework is an useful tool to transfer the vision to strategic plan and to establish measurement system to monitor the key indicators to achieve the strategic goal. What is the key successful factors to attain the benchmarking goal of financial and non-financial perspectives, and how to activate the chain reaction between four perspectives of BSC framework? It is important to understand the effectiveness of BSC management on the indicators under the conductance of action plan. In addition, the influence of sustain execution of BSC management on the trend development of key indicators and the impact of BSC management on the factors of value chain is the major target we want to know from this research.

The hypothesis about the successful management of value chain process and their correlation between these factors is presented in Figure 2. When employee recognize the organizational policy and satisfy with the working climate, they will commit with job performance and engage to provide service with high quality to meet the consumers' preference and need, then the consumer's satisfaction, (in healthcare organization, consumer is patients and their family) will increase. Thereafter the high patient satisfaction will influence the organization reputation and patient flow, the financial outcome and

revenue will increase. The key component of value chain and the activate process of value chain and their interaction relationship are presented in the Figure 2

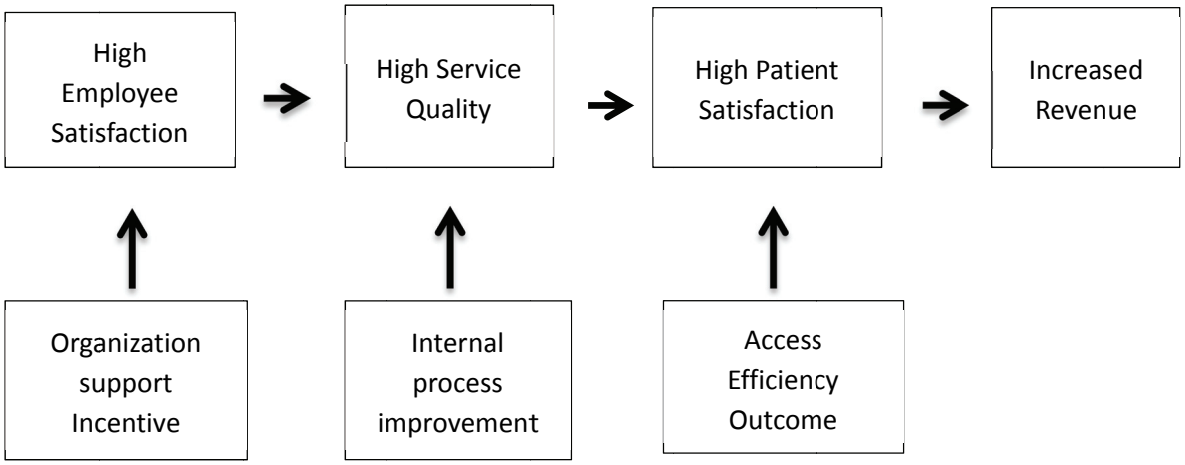

Figure 2. The value chain of successful management of healthcare organization. Adapted from value chain of healthcare by Dr Jin-Tan Chen

How to use the well-connected four perspectives in the BSC management to achieve the goal of healthcare organization and fit the core factors of value chain management in the matched perspective of BSC framework are illustrated in the framework of Figure 3. The interactions between four perspectives all depicted in the Figure 3.

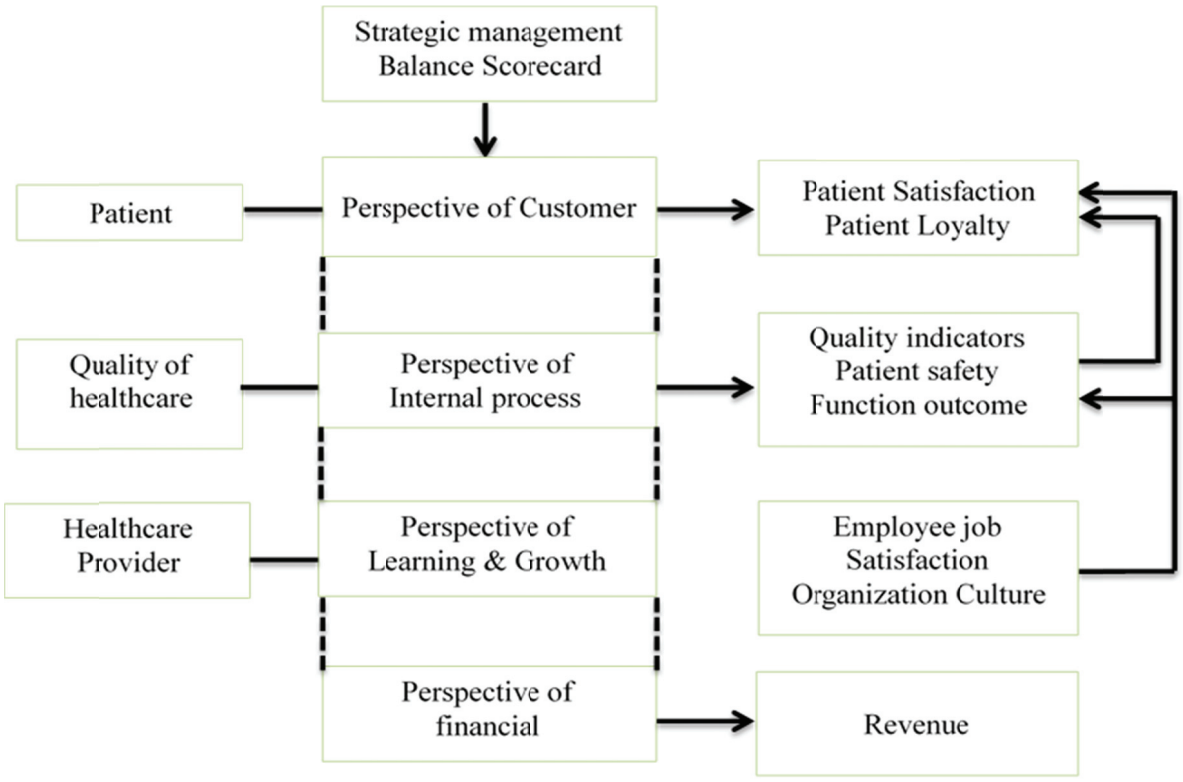

Figure 3: The structure and relationship between the key components of value chain in BSC framework

During the process of organization management under the framework of BSC, well-connected of strategic plan and key performance indicators in four perspectives should be designed to match to the strategic map. If adequate monitoring of key performance indicators was done regularly and the invention strategies were executed efficiently, then the financial and non-financial outcome will improve, the expected outcome will be attained.

This research is to study the effectiveness of sustain implementation of balanced scorecard program on the outcome indicators of four perspectives. The major outcome consist of following measurements: Quality of care related to patient safety indicators in the

internal process perspective; patient satisfaction in the perspective of customer perspective; employee satisfaction and learning culture of organization (patient safety culture) in the perspective of learning and growth; and financial revenue in the perspective of financial.

2. Research goal, hypothesis and method.

2.1. Research goal.

In Taiwan, the framework of balanced scorecard management had been recognized as an effective tool to improve the financial and non-financial growth. It can facilitate the process executed in an integrate framework to enhance customer-driven service, promote patient satisfaction and maximize employee growth and satisfaction in working system. The previous researches are most focus on the one organization and short-term outcome. In our research, we try to examine the effectiveness of BSC management on the performance measurement of key factors in the value chain of healthcare management by the analysis of data files of the conductance of the action plan follow the BSC structure in psychiatric hospital for five years. There are five purposes in our research.

The first purpose of this research is to examine the effectiveness of BSC management on the quality of care and indicators related to patient safety, that is to say, we try to understand the influence on the medical quality and patient safety in the perspective of internal process of BSC

after the implementation of the program to organize the action plans conducted by different department participated in the program.

The secondary purpose of this research is to understand the change of patient satisfaction and the trend development after sustain conductance of BSC management.

The third purpose is to study the change of patient safety culture under sustain conductance of BSC management.

The fourth purpose is to survey the change of employee satisfaction on job under sustain conductance of BSC management.

The fifth purpose is to exam the difference of financial revenue and growth rate between the studied hospital and similar psychiatric hospital that didn’t use BSC framework for hospital management in Taiwan.

2.2. The hypothesis of research.

1. The implementation and conductance of balanced scorecard program has positive effectiveness on the quality of inpatient care and indicators related to patient safety.
2. The sustain execution of balanced scorecard program has positive effectiveness on the trend development of inpatient satisfaction.
3. The sustain execution of balanced scorecard program has positive effectiveness on the change of patient safety culture.
4. The sustain execution of balanced scorecard program has positive effectiveness on the employee satisfaction.
5. The sustain execution of balanced scorecard program in hospital management has positive effectiveness on the hospital financial performance.

2.3. Method:

We collect five data files including (1). Measurement of key performance indicators and progression in the BSC management structure, (2). Outcome of TCPI (Taiwan clinical performance indicators), (3). Satisfaction of patient and employee surveyed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare, (4). Results of patient safety culture surveyed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare, and (5). The financial revenue of psychiatric hospital with similar characteristic in Taiwan. The date files were collected from 2010 to 2015 to compare the difference between after and before the implementation of BSC management program. We also examine the progressive change of these indicators every year after the implementation of BSC program to understand the effectiveness of the BSC program on the measurement indicators in the value chain of the service in psychiatric hospital. We review the change of satisfaction of patient and employee in this five years. In addition, we also examine the change of patient safety represented as organization culture after the implementation of BSC management. Lastly, we collected the data related to the financial performance of five psychiatric hospitals with similar characteristic in Taiwan to examine their difference of growth rate based on their difference about the use the BSC management in hospital.

The process of analysis is presented in Figure 4.

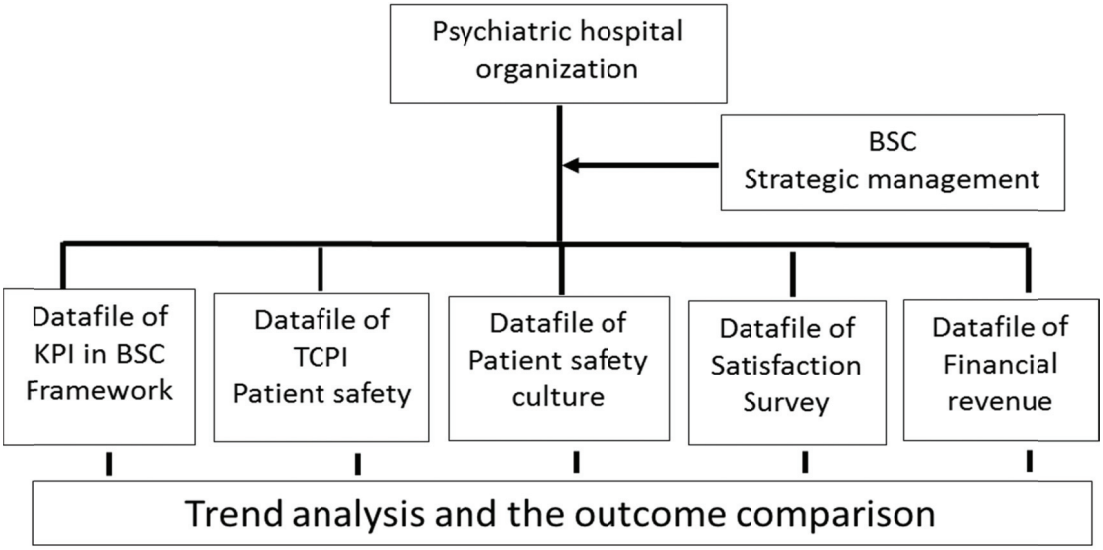

Figure 4. The research process and the analysis of datafiles.

2.3.1. The characteristic of studied organization and structure of BSC management:

A. The characteristic of studied hospital organization, structure of BSC and action plan conducted in the BSC management, and the content of data files are described as follow.

a. Characteristic of organization:

The studied psychiatric hospital located in middle Taiwan to provide comprehensive service for psychiatric patients, consisted of acute and long-term rehabilitative care provided by the coordination of interdisciplinary team. There are several sub-specialties departments to provide care organized by the team consisted of psychiatrist, nursing staff, psychologists, occupational therapist and social workers with well-integration. The studied psychiatric hospital has 197 acute beds to provide intensive care for the patients when their symptoms got exacerbated or the supportive system decompensated. There are 750 chronic beds to provide comprehensive rehabilitation for the patients with deteriorated function. In addition, there are 342 specific community facility to provide service for the chronic psychiatric patients need further rehabilitation for social adjustment.

b. Implementation of Balanced scorecard management program.

The program of balanced scorecard was implemented since 2011, the strategic management was organized by the committee that consisted of executive team leader, chief

of every medical departments. The committee was directed and supervised by superintendent. The consensus meeting was held every year to build up the strategic goal after the formulation of strategic map and SWOT analysis. Then the strategic objective was developed by four management teams that were organized to audit and monitor the indicators of four perspectives including financial, customer, internal process and learning and growth. Every management team consists of eight to ten persons that have completed the comprehensive training program related to BSC management, have owned the knowledge about the balanced scorecard management and are competent to monitor the progress of every action plan and to provide guidance for improvement. Major key performance indicators were selected according to the driving power of key successful factors under discussion and brain storming. Then the strategic action plan will be initiated by the department of psychiatric sub-specialties and executive team, the major action plans are especially focus on the perspective of internal process and learning and growth. Every team should set up the key performance indicators related to the quality of mental health care including patient safety and outcome of medical intervention. The strategic goal is based on the previous performance outcome in hospital or the benchmarking target under the comparison with excellent performance of other organization. The performance outcomes will be feedback every month from informatics center to the team responsible to the action plan. Every team should install the meeting regularly to analyze the difference

between the actual attainment and expected goal to discuss about how to attain the goal by adequate invention based on the analysis of causes that related to the failure to attain the set target. Thereafter, the intervention strategies was invented by discussion based on the evidence from the analysis of the data. The four management team will meet the executive team respectively every month to inspect why lag behind the expected goal and to provide suggestion for further improvement. The performance results of key indicators in every action plan will be monitored and discussed about how to attain the set goal under committee supervision. The data about the indicators of BSC management was collected from 2011 to 2015 and was organized as a datafile of BSC for further analysis. The process about the formation of action plan and the hierarchy of BSC execution are depicted in figure 5 and Figure 6.

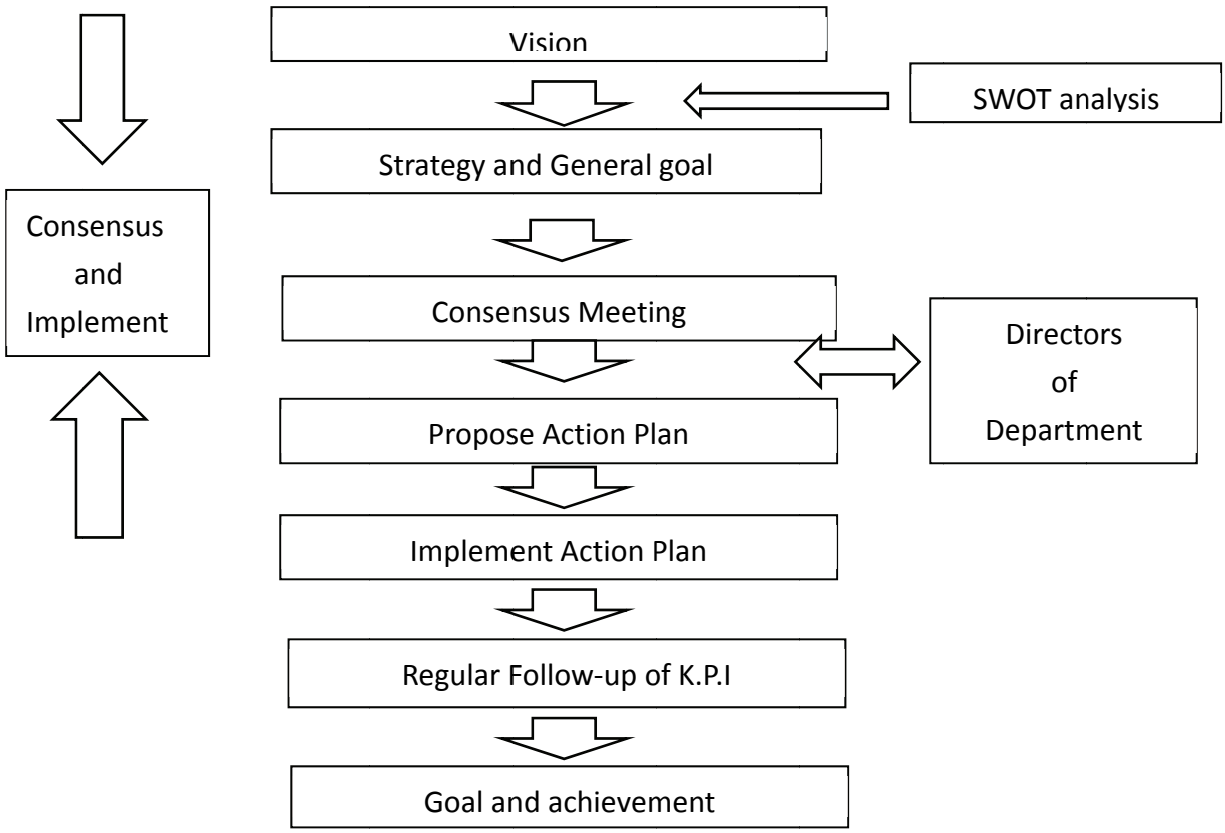

Figure 5. The process of formation of the action plan under BSC management in studied hospital

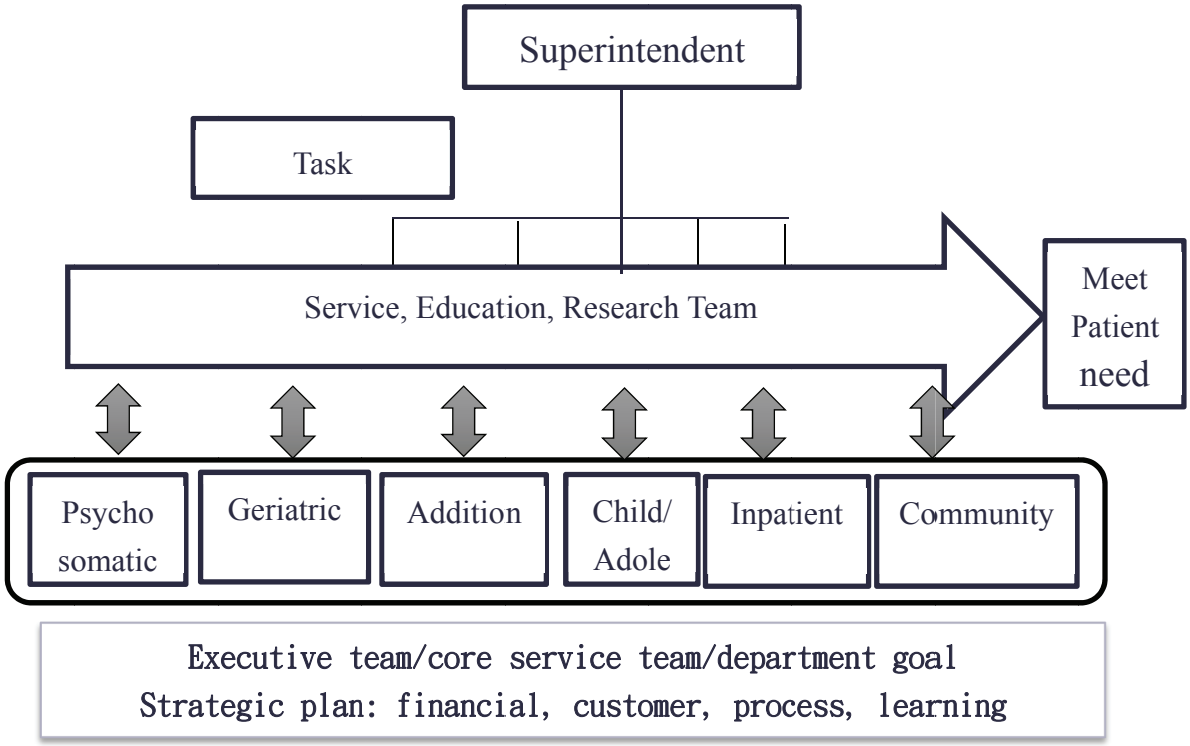

Figure 6. The operation structure of BSC management in studied hospital

During the conductance of BSC management, the well-connected indicators in four perspective in the framework of BSC management is demonstrated in the Figure 7. The structure including strategic objective, action plan, key performance indicators, target and progression of action plan are presented in the following chart. Figure 7 show an example to present the key indicators of four perspectives and the structure to record the conductance results of the action plans and the monitoring of the progression.

Strategic topic: integrate medical resource advanced professional capability								
Perspective	**Strategic objectives**	**Action plan**	**Key Point Index**	**Target**	**Complete rate of target**			
Financial	Growth in net revenues	Financial growth plan	Growth rate of revenue	3%				
	Raise operation margin	Future star plan	Growth rate of operation margin					
	Reduce cost	Saving energy plan	Rate of reduce cost					

Customer	Increase in service volume	Good together plan	Increase in new contract					
		Attraction power plan	Increase in patient volume					
		Home-coming plan	Rate of patient retention					
		Friendly access plan	Growth of community referral					
	Improvement of patient's need	I know your need plan	Number of Promotion project					
		Touch your heart plan	Patient satisfaction					
Internal process	Safety and health	Saving life plan	Reduce density of fall event					
		Sweet home plan	Reduce density of elopement event					

		I has word to say	Reduce density of involuntary restraint event					
		Health promotion And management plan	Increase in patient-center health promotion program					
		Yes I can plan	Rate of advance from function level 3 to level 4					
	Innovation	Creative modification of process plan	Number of innovative service model					
		Clinical pathway of Sub-specialty	Improvement in outcome indication of					

		plan	therapeutic model					
Learning and growth	Human capital	Life glory plan	Program of capability enhancement					
		I have a dream plan	Completion rate of project					
		Happiness plan	Employee satisfaction					

Figure 7. Chart as an example to present the major components of four perspectives in the BSC management structure

The executive team responsible to the action plan should collect the results that had been attained to compare with the strategic goal, then to discuss about why the results lag behind and try to invent intervention strategies based on the analysis of data collected. The Figure 8 present the chart about the diagnosis, analysis and response of action plan conducted in BSC framework.

Action plan: Clinical pathway of psychosomatic disease management

Strategic goal:

1.Completion rate of clinical pathway:≧ 80%

2.Rate of outcome indicators improvement ≧70%

1.Flowchart of execution process：

Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	Completion rate
KPI 1	**100 %**												
KPI 2	**63.6 %**												

2.Analysis of difference：

（1）

（2）

（3）

3.Intervention strategies：

（1）

（2）

Figure 8. The chart about the diagnosis, analysis and response with intervention strategies of action plan conducted in BSC framework.

2.3.2. The data files.

Five Data files were format for research and analysis. The data files consist of different survey about studied hospital and are collected from different resources. The data was retrieved for study without personal identifier. The data files are described as followed.

(1) Datafile of outcome of action plan under the BSC management: The datafile of outcome of action plan under the structure of BSC is collected after implementation of BSC management. The outcome measure is collected as indicators from 2010 to 2015. The progress of key performance indicators including the major indicators related to the outcome after medical interventions initiated by sub-specialty department. The datafile of rehabilitation outcome included in this datafile. The outcome of intervention with rehabilitation program was collected for analysis. The patients with severe mental illness that had been hospitalized for years to receive psychiatric rehabilitation due to progressive functional impairment. The functional level was evaluated by occupational therapist and recorded systemically as databank. These patients were divided into five levels according to their performance function on the standard survey. The functional level was coding from level 1 to level 5 based on the criteria formed and tested of reliability by rehabilitation department. The inter-rater reliability is around 0.85. The functional level of every patient under the rehabilitative program was recorded every

day and been organized as datafile of rehabilitation outcome. This data file was used without personal identifier.

(2) Datafile of TCPI (Taiwan clinic performance indicators): The datafile of TCPI consist of 133 indicators that are collected from daily practice and transformed into indicators according to formula definition for regular monitor and intervention about the deviance of measurement. The measures of TCPI (Taiwan clinical performance indicators) were tabulated in Microsoft excel 2010 to calculated as percentage and density calculated as events/patients days of hospitalization*1000‰. The datafile was collected from January 2010 to December 2015, six major performance quality indicators related to patient safety was included, that is the fall events, self-injury events, violent events, involuntary restrained event ,event of discharged against the medical advice, and elopement event. The results of indicator measurement are coordinated with datafile of BSC structure for further analysis. The indicators of patient safety and their progression are presented as following chart for analysis.

Indicators of Taiwan clinical quality	Average of participated Institutions	1/2011	2/2011	3/2011	4/2011	5/2011		
PSYA-Inj-01								
Self-injury event								
Patient-days								
PSYA-Inj-02								
Violent event								
Patient-days								
PSYA-UnD-02								
Against the medical advice								
Patient-days								
PSYA-UnD-03								
Elopement event								
Patient-days								
PSYA-Res-01								
Involuntary restrain								

Patient-days								
PSYA-Fall-01								
Fall event								
Patient-days								

Figure 9. The chart present the change of major indicators related to patient safety

(3). Datafile of patient safety culture: the datafile was surveyed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare. The datafile of patient safety culture was collected from survey results of patient safety culture consist of every public hospital from 2011 to 2015. The survey of patient safety culture was conducted by the response to the electronic questionnaire including 11 domains completed by the staff of all public hospital of Ministry of Health and Welfare. The questionnaire contain 6 dimensions related to the attitude toward patient safety consist of teamwork cooperation, safety climate, job satisfaction, stress recognition, perception of hospital management, working condition; 5 dimensions related to the organization citizenship behaviors consist of altruism, conscientiousness, organization commitment, harmony relationship and civic virtue. The questionnaire contain 45 items which use the 5-point Likert response scale of agreement (from completely agree to completely disagree) to evaluate the attitude toward the patient safety and their citizen behavior. The reliability expressed as Cronbach's α for the data ranged from 0.51 to 0.84.

The results of survey of patient safety culture were feedback to every hospital in the form of comparison of specific organization between different years and the comparison between index hospital and hospital grouping including all public hospital grouping and psychiatric hospital grouping. The data file just have the original data of studied psychiatric data, there are no original survey data of other public hospitals.

Hospital survey on patient safety culture was designed and revised by AHRQ to assess the patient safety culture of hospital or specific unit, demonstrate good psychometric testing and was translated to different language to be applied in different countries and the results reveal adequate reliability and consistency. It consisted of 12 domains to assess patient safety culture consisted of teamwork within units, supervisor or manager expectation and actions promoting patients safety, hospital management support for patient safety, organizational learning-continuous improvement, overall perceptions of safety, feedback and communication about error, communication openness, frequency of event reporting, teamwork across hospital units, staffing, hospital handoffs and transition, and non-punitive response to error. The questionnaire of AHRQ was used to survey the patient safety culture of public hospital since 2009, then the questionnaire was revised to modify the survey domains and was changed to present composition of questionnaire that contain 6 dimensions related to the attitude toward patient safety and 5 dimensions related to the organization citizenship behavior. The

revised questionnaire of patient safety culture was developed by the expert committee and was used by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare to evaluate the safety culture of public hospital every year since 2010. The factors, principal content and the example of items are described in following chart.

Factors	Content	No of Items	Example of item
Teamwork cooperation	Collaboration, support ,openness handling of conflict	6	People support one another when provide care for the patients
Safety climate	Handling of errors, reporting and analysis	7	In this unit, the medical errors will be managed adequately
Job satisfaction	Satisfaction of job and workplace	5	I am proud to work in this unit
Stress recognition	Recognition of stress as negative impacting individual performance	4	The working efficiency will get worse when I felt tired
Perception of hospital	Feedback and support from organization,	3	Hospital management provide support for my

management	openness of discussion		daily practice
Working condition	Training, support and supervision	5	We have enough staff to handle the workload
Altruism	Support and respectful for staff and colleague	3	I will voluntarily help others who have heavy workloads. I will help to solve the difficulty the staff faced.
Conscientiousness	Self-awareness, compliance with ethic principle and public interest	3	I will be compliant with the norm and policy of organization even there is no supervision.
Organization commitment	Attitude for the organization policy and activity of safety	3	I participate in the activity and the meeting related to the patient safety.
Harmony relationship	Communication and maintenance of harmony relationship	3	I will not sacrifice the team harmony to personal benefit. Staff

			can freely express their complaints about me. I will response with reasoning discussion.
Civic virtue	Utilization of public resource adequately	3	I will use the working time to manage personal affair as welfare.

Figure 10. The factors, principal content and the example of items of patient safety culture survey questionnaire

(4). Datafile of satisfaction of patients and employee: this datafile consisted of three parts, satisfaction of inpatient, outpatient and employee. The satisfaction of patients and employee was surveyed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare every year.

The survey of outpatient satisfaction: this part was done by the survey team and the dimension assessed consisted of patients' perception about the service environment (6 items), perception about the waiting time in the process(6 items), perception about the attitude of professional personal(6 items), the process of service(11 items) and outcome of treatment(5 items), perception about personal right, communication and safety(6

items). The last question added, it evaluates the global satisfaction about the service patient perceived. The data was collected and analyzed, the internal consistency and reliability of six domains is as follow: toward hospital environment, Cronbach's α is 0.86; toward ward environment, Cronbach's α is 0.95; toward waiting time, cronbach's α is 0.90; about the attitude of professionals, Cronbach's α is.92; toward the process of clinical process, Cronbach's α is 0.96; about patient right, communication and safety, Cronbach's α is 0.82; about the outcome of service, cronbach's α is 0.92; the global rating , Cronbach's α is 0.98; Cronbach's α cofficient is above 0.79.

The satisfaction of inpatient: This part consisted of the patient satisfaction lived in acute ward and rehabilitative ward, the date was collected from fixed sampling by random selection of patients for survey about their satisfaction with hospital service performed by Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare every year. The dimension of satisfaction consisted following dimensions: patients' perception about the hospital environment (6 items), toward the attitude of professional personal 6 items), toward the process of service (11 items) process and outcome of treatment (5 items); in addition, the perception about personal right, communication and safety (6 items). The internal consistency and reliability of the survey questionnaire of inpatient satisfaction,

toward hospital environment, Cronbach's α is 0.86: toward the attitude of professionals, Cronbach's α is 0.90; toward the process service, Cronbach's α is 0.93; about personal right, communication and safety, Cronbach's α is 0.84; about the outcome of treatment, cronbach's α is 0.90; Cronbach's α cofficient is above 0.79.

The satisfaction of employee: The data was collect by electronic questionnaire fitted by the employee worked in the public hospital belong to the Ministry of Health and Welfare. The questionnaire consist of six dimensions about satisfaction with the job. There are 29 items which use the 5-points Likert response scale of agreement (from completely agree to completely disagree) in the questionnaire. The internal consistency and reliability of questionnaire is as followed: toward job environment (7 items), Cronbach's α is 0.92; about organization commitment (5 items) Cronbach's α is 0.93; about working climate (8 items), Cronbach's α is 0.93; toward learning and growth(3 items), Cronbach's α is 0.95; toward the opportunity of promotion(3 items), Cronbach's α is 0.96, about warfare and benefit (3 items), Cronbach's α is 0.95; reliability and internal consistency is very well.

(5). The datafile of financial performance measurement of public psychiatric hospitals: the data was collected from financial performance of psychiatric hospitals including 5 hospital with similar characteristic in Taiwan. The information was formulated as simple datafile.

The public psychiatric hospitals are established to provide service for the patients with mental diseases, the inpatients service was provided for the patients with severe mental illness such as schizophrenia, bipolar mood disorder, major depression organic mental disorder, autistic spectrum disorder and intellectual disability. In addition, there are rehabilitation facilities for chronic patients. The key financial performance measurement was compared between the psychiatric hospital with similar characteristic in Taiwan in this research.

Chapter Four: Analysis of data

Data analysis was performed with SPSS for Windows Version 18 including Descriptive statistical analysis to determine the characteristic of organization consisted of demographic data of inpatient and distribution of diagnosis. The effectiveness of BSC management on the indicators related to the patient safety presented as density is done by proportional ratio Z test to exam the significance of difference by comparison between after the implementation of BSC and before implementation of BSC management, the same method is used to exam the difference by the comparison between every following 2 years.

ANOVA F test in one way and post hoc least-significant difference are used to exam the significant difference of inpatient satisfaction in the domains surveyed in different years. The chi-square test to evaluate the significance of influencing variable on the inpatient satisfaction. The t-test is used to compare the difference in the domains of patient safety culture between different years.

Chapter Five: The Results

1. The basic data about organization, inpatient composition and the action plans

The characteristic composition of inpatient including age distribution, gender ratio, and categories of diagnosis are present in table 1. There are no significant difference in these five years. The male gender of inpatient is around 60%, female around 40%; most of the inpatient is at the age of 41-60 y/o, and most of the diagnosis of inpatients is schizophrenia, is above 90 %.

Table 1. The demographic composition of inpatients in studied psychiatric hospital.

	2010 N:988	2011 N:961	2012 N:883	2013 N:877	2014 N:989	2015 N:930
Gender						
Male (%)	606 (61.3)	586 (61.0)	525 (59.5)	514 (58.6)	619 (62.6)	571 (61.4)
Female (%)	382 (38.7)	375 (39.0)	358 (40.5)	363 (41.4)	370 (37.4)	359 (38.6)
Age						
Below 20 (%)	4 (0.4)	2 (0.2)	1 (0.1)	0 (0.0)	2 (0.2)	2 (0.2)
21-30y/o (%)	44 (4.5)	50 (5.2)	43 (4.9)	41 (4.7)	35 (3.5)	22 (2.4)
31-40y/o (%)	193 (19.5)	171 (17.8)	149 (16.9)	137 (15.6)	145 (14.7)	121 (13.0)
41-50y/o (%)	367 (37.1)	328 (34.1)	291 (33.0)	285 (32.5)	310 (31.3)	282 (30.3)
51-60y/o (%)	299 (30.3)	317 (33.0)	301 (34.1)	294 (33.5)	353 (35.7)	334 (35.9)

61-70y/o (%)	78 (7.9)	91 (9.5)	93 (10.5)	115 (13.1)	134 (13.5)	154 (16.6)
Above71y/o (%)	3 (0.3)	2 (0.2)	5 (0.6)	5 (0.6)	10 (1.0)	15 (1.6)
Diagnosis						
Schizophrenia (%)	919 (93.0)	901 (93.8)	820 (92.9)	822 (93.7)	927 (93.7)	873 (93.9)
Mood disorder (%)	41 (4.2)	31 (3.2)	31 (3.5)	27 (3.1)	29 (2.9)	24 (2.6)
Organic mental disorder (%)	22 (2.2)	22 (2.3)	25(2.8)	23 (2.6)	25 (2.5)	26 (2.8)
Others (%)	6 (0.6)	7 (0.7)	7 (0.8)	5 (0.6)	8 (0.8)	7 (0.8)
Total	988	961	883	877	989	930

Table 2 and 3 show the major action plans that were executed by medical department in the perspective of internal process of BSC framework from 2010 to 2015. Some of the action plans were executed every year, some specific action plan was changed when the strategic goal had been attained and the working process had been standardized.

Table 2: The action plan of BSC management for quality indicators from 2010 to 2015.

Action Plan	2010	2011	2012	2013	2014	2015
Prevention of fall events	✗	✓	✓	✓	✓	✓
Prevention of self-injury accident	✗	✓	✓	✗	✗	✗
Prevention of violence behavior	✗	✓	✓	✗	✗	✗
Reduce restraint density	✗	✗	✓	✓	✗	✓
Prevention of elopement	✗	✗	✓	✓	✓	✗
Prevention of discharge against advice	✗	✗	✓	✓	✗	✗

✓ represent the conductance of action plan in that year

✗ represent no implementation of action plan in that year

Table 3. The action plan of BSC management in sub-specialty department from 2010 to 2015.

Action Plan	2010	2011	2012	2013	2014	2015
Geriatric department	✗	✓	✓	✓	✓	✓
Psychosomatic department	✗	✓	✓	✓	✓	✓
Addition department	✗	✓	✓	✓	✓	✓
Child psychiatric department	✗	✓	✓	✓	✓	✓
Rehabilitation department	✗	✓	✓	✓	✓	✓
Health management	✗	✓	✓	✓	✓	✓

✓represent the conductance of action plan in that year

✗ represent no implementation of action plan in that year

2. Results of hypothesis 1: The effectiveness of BSC management on the indicators of patient safety.

2.1. The difference of quality indicators related to patient safety after BSC management.

The effectiveness of the intervention on the quality indicators related to the patient safety after the conductance of balanced scored card program is showed in Table 4 to table 9. These results are analyzed from datafile of TCPI and BSC management program in the studied hospital. These tables present the comparison between after the implementation of BSC (2011-2015) and before the implementation of BSC (2010). The results are showed in table 4 to table 9. In addition, Table 4.1, 5.1, 6.1, 7.1, 8.1 and 9.1 show the comparison between 2 following years to represent the progressive change of indicators year by year under the sustain execution of BSC management. The results consist of six major quality indicators of TCP related to patient safety, that is density of fall event, density of self-injury event, density of violence event, density of involuntary restraint event, density of elopement event, and the density of discharged against the medical advice event.

2.1.1 The results of effectiveness of BSC management on the density of fall event

Table 4 shows the results about the comparison of density of fall event between after the implementation of BSC (2011-2015) and before the implementation of BSC management (2010). The results reveal the significant difference after the conductance of BSC management in 2011 and 2012 by proportional ratio Z test. The density of fall event

increases in 2013, 2014 and 2015 compared to 2010 and had significant difference. According to the decision rule for this two-tailed test the Z is less than -1.96, or greater than 1.96, reject the null hypothesis and represent the significant difference. The density of fall event decreases in 2011 is related to the intervention strategy with the establishment of assessment scale for classification of the risk level and followed by the individualized prevention action toward patient with different level of risk. The alert system to enhance the sensitivity of frontline caring staff to pay more attention to the patients with high risk level by assessment. The density of fall event decrease in 2012 is related to the detailed analysis of data of fall event and the staffs' engagement with the PDCA cycle to target the risk factors such as wet environment and inadequate slippery to improve the safety facility.

Table 4.1 shows the results of comparison of density of fall event between every following years, that is the comparison between 2012 and 2011, comparison between 2013 and 2012, comparison between 2014 and 2013, and comparison between 2015 and 2014. The results reveal that the comparison between 2012 and 2011 is significant difference and density of fall event is decreased. The comparison between 2013 and 2012, 2014 and 2013, 2015 and 2014 revealed the density of fall event increases and has significant difference under continuousness conductance of action plan to prevent the fall event In BSC management framework. It means that the density of fall event is increased progressively from 2013 to 2015.

Table 4. The comparison of density of fall event between after and before BSC management.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2010	203	341,266	0.06	2011/2010	-62.277	***
2011	173	338,380	0.05	2012/2010	-145.32	***
2012	141	338,557	0.04	2013/2010	48.9828	***
2013	227	338,830	0.07	2014/2010	205.1397	***
2014	336	340,058	0.10	2015/2010	236.0069	***
2015	383	358,919	0.11			

Density of fall events= events of fall/patients-days*1000‰。

Table 4-1. The comparison of the density of fall event year by year.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2011	173	338,380	0.05	2012/2011	-84.063	***
2012	141	338,557	0.04	2013/2012	192.008	***
2013	227	338,830	0.07	2014/2013	158.031	***
2014	336	340,058	0.10	2015/2014	32.103	***
2015	383	358,919	0.11			

Density of fall events= events of fall-injury/patients-days*1000‰。

2.1.2. The results of effectiveness of BSC management on the density of self-injury event

Table 5 shows the results about the comparison of density of self-injury event between after the implementation of BSC (2011-2015) and before the implementation of BSC management (2010), the results reveale the significant difference after the conductance of BSC management in 2011 and 2012 by proportional ratio Z test. According to the decision rule for this two-tailed test the Z is less than -1.96, or greater than 1.96, reject the null hypothesis and represent the significant difference. The density of self-injury event increases in 2013, 2014 and 2015 compared with 2010 and has significant difference. The decreased density of self-injury event in 2011 is related to the intervention strategy with the establishment of clinical pathway and standardized process to enhance the therapeutic maneuver toward the patients of high risk level with the increased intensity of monitoring meeting. The decreased density of self-injury event is related to the intervention in action plan to add the training program for frontline staff to acquire the skill of dynamic assessment about self-injury risk and counseling with the patients to enhance the problem solving skill to relieve inner distress.

Table 5.1 shows the results of comparison of density of self-injury event between every following years, that is the comparison between 2012 and 2011, comparison between 2013 and 2012, comparison between 2014 and 2013, and comparison between

2015 and 2014. The results reveal the comparisons between 2012 and 2011, 2013 and 2012, 2014 and 2013, 2015 and 2014, the density of self-injury event increases and has significant difference under the continuous conductance of BSC management. It means that the density of self-injury event increases significantly progressively.

Table 5. The comparison of density of self-injury event between after and before BSC management.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2010	133	341,266	0.39	2011/2010	-252.352	***
2011	70	338,380	0.21	2012/2010	-28.9222	***
2012	123	338,557	0.36	2013/2010	29.94357	***
2013	142	338,830	0.42	2014/2010	61.86043	***
2014	154	340,058	0.45	2015/2010	106.8514	***
2015	181	358,919	0.50			

Density of self-injury= events of self-injury/patients-days*1000‰。

Table 5-1. The comparison of density of self-injury event year by year.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2011	70	338,380	0.21	2012/2011	225.725	***
2012	123	338,557	0.36	2013/2012	58.678	***
2013	142	338,830	0.42	2014/2013	31.913	***
2014	154	340,058	0.45	2015/2014	44.840	***
2015	181	358,919	0.50			

Density of violent events= events of violence/patients-days*1000‰。

2.1.3. The results of effectiveness of BSC management on the density of violent event

Table 6 shows the results about the comparison of density of violent event between after the implementation of BSC (2011-2015) and before the implementation of BSC management (2010), the results reveal the significant difference in 2011, 2012, and 2013 compared to 2010 after the conductance of BSC management by proportional ratio Z test. According to the decision rule for this two-tailed test the Z is less than -1.96, or greater than 1.96, reject the null hypothesis and represent the significant difference. The density of violent decreases significantly and improve after conductance of action plans. The density of violent event decreases in 2011 is related to the intervention strategies with comprehensive assessment of violent risk and intensive monitoring followed the standardized process to reduce the violent risk by early detection of antecedent sign of violent behavior. The density of violent event decreases in 2012 is related to the individualized behavioral therapy to reduce the arousal environmental stimuli and intensive pharmacotherapy.

Table 6.1 shows the results about the comparison of density of violent event between every following years, that is the comparison between 2012 and 2011, comparison between 2013 and 2012, comparison between 2014 and 2013, and comparison between 2015 and 2014. The results reveal the comparisons between 2012 and 2011, 2013 and 2012, 2014 and 2013, 2015 and 2014, the density of violent event increases and has significant difference under the continuous conductance of BSC management. It means that the density of violent

event is increased significantly progressively.

Table 6. The comparison of the density of violent event between after and before BSC management.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2010	406	341,266	1.19	2011/2010	-136.673	***
2011	288	338,380	0.85	2012/2010	-131.378	***
2012	292	338,557	0.86	2013/2010	-7.32896	***
2013	396	338,830	1.17	2014/2010	71.25702	***
2014	481	340,058	1.41	2015/2010	104.9775	***
2015	550	358,919	1.53			

Density of violent events= events of violence/patients-days*1000‰。

Table 6-1. The comparison of the density of violent event year by year.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2011	288	338,380	0.85	2012/2011	5.459	***
2012	292	338,557	0.86	2013/2012	124.081	***
2013	396	338,830	1.17	2014/2013	78.368	***
2014	481	340,058	1.41	2015/2014	33.405	***
2015	550	358,919	1.53			

Density of violent events= events of violence/patients-days*1000‰。

2.1.4. The results of effectiveness of BSC management on the density of involuntary restraint event

Table 7 shows the results about the comparison of density of involuntary restraint between after the implementation of BSC (2011-2015) and before the implementation of BSC management (2010), the results reveal the significant difference in 2011, 2012, 2013 and 2015 after the conductance of BSC management by proportional ratio Z test. According to the decision rule for this two-tailed test the Z is less than -1.96, or greater than 1.96, reject the null hypothesis and represent the significant difference. The density of involuntary restraint decrease significantly in 2011, 2012, 2013 and 2015 compared to 2010. The density of involuntary restraint decrease in 2012 is related to the intervention strategies conducted in action plan with the advocacy of organization policy and regular reminder of the legal regulation about restraint and followed by debriefing discussion about the adequacy of restraint maneuver. The density of involuntary restraint decreases in 2013 with intervention strategies conducted in action plan with the detailed analysis about the deviance of ward and physician to detect the inadequate maneuver to reduce the further adverse event by training program for the target problems. The decreased the density of involuntary restraint in 2015 is related to the conductance of action plan with monitoring of inadequate use of restraint and provide coping skill and self-regulation skill for patient to manage their symptoms and inner distress.

Table 7.1 shows the results about the comparison of density of involuntary restraint between every following years, that is the comparison between 2012 and 2011, comparison between 2013 and 2012, comparison between 2014 and 2013, and comparison between 2015 and 2014. The results reveal the decrease in density and have significant difference in the comparison between 2013 and 2012, between 2015 and 2014. The density of involuntary restraint increases in 2014 compared to 2013.

Table 7. The comparison of density of involuntary restraint between after and before BSC management.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2010	702	53,587	13.1002	2011/2010	-10.8722	***
2011	759	61,771	12.2873	2012/2010	-10.3303	***
2012	831	67,331	12.3420	2013/2010	-59.4016	***
2013	629	67,479	9.3214	2014/2010	13.52711	***
2014	980	69,176	14.1668	2015/2010	-49.0045	***
2015	698	70,325	9.9253			

Density of involuntary restrain= events of involuntary restraint/patients-days*1000‰。

Table 7-1. The comparison of density of involuntary restraint year by year.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2011	759	61,771	12.2873	2012/2011	0.797	
2012	831	67,331	12.3420	2013/2012	-51.203	***
2013	629	67,479	9.3214	2014/2013	76.058	***
2014	980	69,176	14.1668	2015/2014	-65.848	***
2015	698	70,325	9.9253			

Density of involuntary restrain= events of involuntary restraint/patients-days*1000‰。

2.1.5. The results of effectiveness of BSC management on the density of elopement event

Table 8 shows the results about the comparison of density of elopement event between after the implementation of BSC (2011-2015) and before the implementation of BSC management (2010). The results reveal significant difference in 2011, 2012, 2013, 2014 and 2015 after the conductance of BSC management by proportional ratio Z test. According to the decision rule for this two-tailed test the Z is less than -1.96, or greater than 1.96, reject the null hypothesis and represent the significant difference. The density of elopement event decreases in 2011 is related to the intervention strategies conducted in action plan with the regular monitoring of risk factors in specific situation that increased the happening of adverse event. The density of elopement decreases in 2012 is related to the establishment of alert system and enhanced sensitivity of staff to aware the possible influencing factors. The density of elopement event decreases in 2013 is related to the TRM (team resource management) to assure the patient safety.

Table 8.1 shows the results about the comparison of density of elopement event between every following years, that is the comparison between 2012 and 2011, comparison between 2013 and 2012, comparison between 2014 and 2013, and comparison between 2015 and 2014. The results reveal significant difference of comparison between 2014 and 2013, the density of elopement decreased. The density of

elopement event increases in 2013 compared to 2012 and has significant difference. There are no significant difference in the comparison between 2012 and 2011, and between 2015 and 2014.

Table 8. The comparison of density of elopement event between after and before BSC management.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2010	33	1,071	3.08	2011/2010	-19.5115	***
2011	14	1,102	1.27	2012/2010	-18.1222	***
2012	15	1,101	1.36	2013/2010	-7.63829	***
2013	21	963	2.18	2014/2010	-12.6144	***
2014	18	1,031	1.75	2015/2010	-13.5041	***
2015	20	1,161	1.72			

Density of elopement= event of elopement events/patients-days*1000‰。

Table 8-1. The comparison of density of elopement event year by year.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2011	14	1,102	1.27	2012/2011	1.640	
2012	15	1,101	1.36	2013/2012	10.633	***
2013	21	963	2.18	2014/2013	-4.961	***
2014	18	1,031	1.75	2015/2014	-0.313	
2015	20	1,161	1.72			

Density of elopement= event of elopement events/patients-days*1000‰。

2.1.6. The results of effectiveness of BSC management on the density of discharged against medical advice event

Table 9 shows the results about the comparison of density of discharged against medical advice event between after the implementation of BSC (2011-2015) and before the implementation of BSC management (2010) by proportional ratio Z test. According to the decision rule for this two-tailed test the Z is less than -1.96, or greater than 1.96, reject the null hypothesis and represent the significant difference. The results reveal significant difference in 2011, 2014 and 2015, the density decreases after the conductance of BSC management, the density of discharged against medical advice event increases in 2013 and there is no significant difference in 2012 compared to 2010. The density of discharged against the medical advice event decreases in 2012 is related to the intervention strategies conducted in action plan with standardize protocol provided to target the patient group with specific characteristic. The conductance of action plan in 2013 is to provide intervention with skill enhancement of staff to establish rapport in initial stage to modify the intention of patient prone to self-discharged, but the results revealed the effectiveness of BSC management on the discharged against the medical advice event is not significant.

Table 9.1 shows the results about the comparison of density of discharged against medical advice between every following year, that is the comparison between 2012 and 2011, comparison between 2013 and 2012, comparison between 2014 and 2013,

comparison between 2015 and 2014, and comparison between 2015 and 2014. The results reveal the increase in the density and have significant difference in the comparison between 2012 and 2011, and between 2013 and 2012. The density of discharged against medical advice event decreases in the comparison between 2014 and 2013, and between 2015 and 2014.

Table 9. The comparison of density of discharged against medical advice event between after and before BSC management.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2010	50	872	5.73	2011/2010	-6.40511	***
2011	40	943	4.24	2012/2010	-1.13374	
2012	57	1,047	5.44	2013/2010	2.557382	**
2013	54	832	6.49	2014/2010	-4.89567	***
2014	38	841	4.52	2015/2010	-7.35187	***
2015	40	982	4.07			

Density of discharged against advice=event of AAD/patients- days*100%

Table 9-1. The comparison of density of discharged against medical advice event year by year.

Year	N	Total patients-day	Density(‰)	Comparison	Z	significant
2011	40	943	4.24	2012/2011	5.494	***
2012	57	1,047	5.44	2013/2012	3.813	***
2013	54	832	6.49	2014/2013	-7.334	***
2014	38	841	4.52	2015/2014	-2.214	**
2015	40	982	4.07			

Density of discharged against advice=event of discharged against the medical advice/patients-days*100%

2.1.7. The results of effectiveness of BSC management on the function improvement after rehabilitation action plan

Table 10 shows the outcome of action plan of rehabilitative program to improve patients' function advanced from level 3 to level 4. The program was designed as individualized intervention according to the patients' interest, preference, and functional status to build up the treatment program for further advancement of patients' function. The intervention program consisted of pre-program assessment; intervention with group therapy to motivate them engage with rehabilitative training activity; implement the individualized rehabilitative program and provide mental support to enhance perseverance, frustration tolerance and social adjustment.

The results show the successful ratio that improved from level 3 to level 4 after the implementation of BSC management. The successful ratio of 2011, 2012, 2013, 2014 and 2015 is better than 2010.

Table 10: Function outcome and the successful rate after rehabilitative program from 2010 to 2015.

Function outcome	2010	2011	2012	2013	2014	2015
Level 3	66	79	118	247	280	353
Level 3 advanced to level 4	7	22	28	50	47	45
Successful ratio (%)	10.6	27.9	23.7	20.2	16.8	12.7

3. Results of hypothesis 2: the effectiveness of BSC management on patient satisfaction

The results of effectiveness of BSC management on inpatient satisfaction

Table 11 shows the results about the comparison of inpatient satisfaction between 2015 and 2012, 2013 and 2014. The satisfaction of inpatient in 2015 is better than 2014, 2013 and 2012 after the sustain conductance of BSC management. These results are analyzed from the datafile of patient satisfaction surveyed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare. The significant difference is found in the dimensions of satisfaction survey including the satisfaction toward hospital environment, professional attitude, service process, personal right, communication and safety, and treatment outcome.

Table 11. The comparison of inpatient satisfaction between 2015 and 2012, 2013, and 2014.

	Year	N	Average	SD	F-value	Post hoc LSD
	2012	294	3.95	0.77	3.409*	2015>2014;
Hospital	2013	315	3.92	0.71		2015>2013;
environment	2014	315	3.97	0.73		2015>2012
	2015	315	4.09	0.77		

	2012	294	4.03	0.76	3.045*	2015>2014;
Professional	2013	315	4.03	0.65		2015>2013;
attitude	2014	315	4.05	0.73		2015>2012
	2015	315	4.18	0.71		
	2012	294	3.95	0.85	3.423*	2015>2014;
Service	2013	315	3.98	0.73		2015>2013;
process	2014	315	4.00	0.82		2015>2012
	2015	315	4.14	0.74		
Personal	2012	293	3.85	0.89	7.178***	2015>2014;
right,	2013	314	3.78	0.93		2015>2013;
communicati	2014	315	3.87	0.92		2015>2012
on and safety	2015	315	4.09	0.84		
	2012	294	4.03	0.90	3.775*	2015>2014;
treatment	2013	313	3.99	0.91		2015>2013;
Outcome	2014	315	4.04	0.91		2015>2012
	2015	315	4.21	0.81		

*p< .05 **p < .01 ***p< .001

Further analysis about the related factors influencing on the inpatient satisfaction are

performed, the results show that age, admission times and duration of hospitalization have positive influence with significant difference after F-test, the results are presented in table 12.

Table 12. The influencing variable on the inpatient satisfaction.

Variable	Year				χ2-value	p-value
	2012	2013	2014	2015		
Gender	Overall (%)				0.714	0.870
Male	176	193	199	194		
	23.1	25.3	26.1	25.5		
Female	118	122	116	121		
	24.7	25.6	24.3	25.4		
Education level	Overall (%)				12.407	0.414
Elementary school	40	39	44	39		
	24.7	24.1	27.2	24.1		
Junior high school	89	99	84	94		
	24.3	27.0	23.0	25.7		
High school	117	118	130	112		

	24.5	24.7	27.3	23.5		
College	44	51	51	58		
	21.6	25.0	25.0	28.4		
Master degree	2	5	6	12		
	8.0%	20.0%	24.0%	48.0%		
Age	Overall (%)				25.376	0.045*
19y/o below	1	0	0	1		
	50.0	0.0	0.0	50.0		
21-30 y/o	10	11	6	5		
	31.3	34.4	18.8	15.6		
31-40 y/o	40	36	37	36		
	26.8	24.2	24.8	24.2		
41-50 y/o	99	98	86	85		
	26.9	26.6	23.4	23.1		
51-60 y/o	110	98	120	126		
	24.2	21.6	26.4	27.8		
61 y/o above	31	42	66	62		
	15.4	20.9	32.8	30.8		

Admission times	Overall (%)				37.295	0.000*
First time	97	83	101	104		
	25.2	21.6	26.2	27.0		
2 times	60	78	78	115		
	18.1	23.6	23.6	34.7		
3-5 times	81	83	78	54		
	27.4	28.0	26.4	18.2		
6-9 times	36	35	26	22		
	30.3	29.4	21.8	18.5		
10 times above	19	25	32	20		
	19.8	26.0	33.3	20.8		
Duration of hospitalization	Overall (%)				44.847	0.002*
Less than month	3	7	5	4		
	15.8	36.8	26.3	21.1		
1-2 months	9	11	4	9		
	27.3	33.3	12.1	27.3		
3-6 months	25	25	16	20		

	29.1	29.1	18.6	23.3
	12	17	25	25
7-12 months				
	15.2	21.5	31.6	31.6
	69	61	51	61
1-3 years				
	28.5	25.2	21.1	25.2
	45	53	51	53
4-6 years				
	22.3	26.2	25.2	26.2
	54	37	34	25
7-9 years				
	36.0	24.7	22.7	16.7
	76	95	129	118
10 years above				
	18.2	22.7	30.9	28.2

4. Results of Hypothesis 3: the effectiveness of BSC management on patient safety culture

The effectiveness of BSC management on the patient safety culture

The survey of patient safety culture was performed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare to survey the patient safety culture of all public hospitals of Ministry of Health and Welfare with electronic questionnaire. The data was collected from the response of the staff within the time of one month, the response rate is as follow:

Year	Response rate of all public hospitals (%)	Response rate of studied psychiatric hospital (%)
2011	62.5	81.2
2012	64.8	82.3
2013	64.9	90.1
2014	69.9	89.4
2015	70.8	84.5

Table 13 shows the results about the survey of patient safety culture from 2010 to 2015 in eleven domains. These results are analyzed from the datafile of patient safety culture surveyed by the Hospital and Social Welfare Organization Administration Commission, Ministry of Health and Welfare.

Table13. The scores of patient safety culture of studied hospital from 2010 to 2015.

Dimension	2010	2011	2012	2013	2014	2015
Teamwork cooperation	3.72	3.59	4.00	4.15	4.09	4.04
Safety climate	3.73	3.94	4.00	4.24	4.09	3.98
Job satisfaction	3.98	3.92	4.00	4.52	4.16	3.88
Stress recognition	3.86	4.07	3.70	4.12	3.60	3.56
Perception of hospital management	3.75	3.89	4.10	4.54	4.19	4.00
Working condition	3.94	3.56	3.80	4.40	3.95	3.83
Altruism	4.39	4.38	4.40	4.71	4.44	4.32
Conscientiousness	4.12	4.22	4.20	4.67	4.30	4.16
Organization commitment	3.69	3.96	4.00	4.45	4.14	3.98
Harmony relationship	4.53	4.28	4.10	3.39	4.27	4.17
Civic virtue	4.61	4.53	4.40	3.67	4.56	4.44

Table 14 shows the comparison of patient safety culture between studied hospital and all public hospital group of Ministry of Health and Welfare, the results reveal that studied hospital has significant difference in the domains of teamwork cooperation, safety climate, job satisfaction, perception of hospital management, working condition, altruism,

conscientiousness and organization commitment. The scores in these domains are beyond the average scores of all public hospital group. These results are analyzed from the datafile of patient safety culture.

Table 14.The comparison of scores between studied hospital and all hospital group in 2015

Dimension	All hospitals N=9912		Studied hospital N=419		t	p-value
	mean	std.	mean	std.		
Teamwork cooperation	3.82	0.76	4.07	0.75	-6.089***	<0.001
Safety climate	3.77	0.72	4.00	0.74	-6.105***	<0.001
Job satisfaction	3.80	0.90	3.90	0.93	-2.235*	<0.05
Stress recognition	3.58	1.09	3.58	1.10	0.093	0.926
Perception of hospital management	3.85	0.87	4.02	0.87	-3.969***	<0.001
Working condition	3.62	0.85	3.85	0.85	-5.078***	<0.001
Altruism	4.22	0.82	4.35	0.78	-3.191**	<0.01
Conscientiousness	4.09	0.79	4.18	0.80	-2.246*	<0.05
Organization commitment	3.82	0.83	4.00	0.85	-4.280***	<0.001
Harmony relationship	4.13	0.97	4.19	0.99	-1.215	0.224

Civic virtue	4.44	0.91	4.47	0.93	-0.765	0.444

*p< .05 **p < .01 ***p< .001

Table 15 shows the comparison between studied hospital and all psychiatric hospital group of Ministry of Health and Welfare, the results reveal that studied hospital has significant difference in the domains of teamwork cooperation, safety climate and working condition. The score in these domains are beyond the average scores of all psychiatric hospital group. These results are analyzed from the datafile of patient safety culture.

Table 15.The comparison of patient safety culture between studied hospital and all psychiatric hospitals in 2015

Dimension	All Psychiatric hospital N=1485		Studied hospital N=419		t	p-value
	mean	std.	mean	std.		
Teamwork cooperation	3.97	0.75	4.07	0.75	-2.266*	<0.05
Safety climate	3.91	0.73	4.00	0.74	-2.091*	<0.05
Job satisfaction	3.87	0.92	3.90	0.93	-0.677	0.499
Stress recognition	3.60	1.11	3.58	1.10	0.407	0.684
Perception of hospital management	3.96	0.84	4.02	0.87	-1.188	0.235
Working condition	3.70	0.86	3.85	0.85	-2.930**	<0.01
Altruism	4.34	0.77	4.35	0.78	-0.254	0.799
Conscientiousness	4.19	0.76	4.18	0.80	0.094	0.925
Organization commitment	3.91	0.83	4.00	0.85	-1.889	0.059

Harmony relationship	4.21	0.94	4.19	0.99	0.229	0.819
Civic virtue	4.47	0.89	4.47	0.93	-0.048	0.962

*p< .05 **p < .01 ***p< .001

Table 16 shows the comparison of patent safety culture between 2014 and 2013 in studied hospital, the results reveal the significant difference in the domains of teamwork cooperation, safety climate, perception of hospital management, working condition, altruism and organization commitment in 2014 compared to 2013. The scores in these domains are improved. The results are analyzed from the datafile of patient safety culture.

Table 16. The comparison of patient safety culture score between 2014 and 2013 in studied hospital.

Dimension	Year 2013 N=291		Year 2014 N=468		p-value
	mean	std.	mean	std.	
Teamwork cooperation	3.90	0.66	4.09	0.70	*
Safety climate	3.96	0.59	4.09	0.65	*
Job satisfaction	4.24	0.68	4.16	0.80	
Stress recognition	4.09	0.83	3.60	1.12	
Perception of hospital management	4.24	0.69	4.19	0.76	*
Working condition	4.18	0.80	3.95	0.81	*
Altruism	4.61	0.57	4.44	0.71	*
Conscientiousness	4.52	0.51	4.30	0.70	
Organization commitment	4.20	0.69	4.14	0.76	*
Harmony relationship	3.19	0.90	4.27	0.91	
Civic virtue	3.54	0.84	4.56	0.83	

*p< .05 **p < .01 ***p< .001

Table 17 shows the comparison of patent safety culture between 2015 and 2014 in studied hospital, the results reveal the significant difference in the domains of safety climate, job satisfaction, perception of hospital management, learning and continuous improvement and organization commitment in 2015 compared to 2014. These results are analyzed from the datafile of patient safety culture.

Table 17 The comparison of patient safety culture score between 2015 and 2014 in studied hospital.

Dimension	Year 2014 N=468		Year 2015 N=419		T value	p-value
	mean	std.	mean	std.		
Teamwork cooperation	4.11	0.69	4.07	0.75	0.845	0.398
Safety climate	4.10	0.63	4.00	0.74	2.115*	<0.05
Job satisfaction	4.16	0.80	3.90	0.93	4.323***	<0.001
Stress recognition	3.61	1.14	3.58	1.10	0.387	0.699
Perception of hospital management	4.20	0.75	4.02	0.87	3.236**	<0.01
Working condition	3.95	0.82	3.85	0.85	1.834	0.067
Altruism	4.45	0.71	4.35	0.78	1.949	0.052
Conscientiousness	4.30	0.70	4.18	0.80	2.370*	<0.05
Organization commitment	4.16	0.75	4.00	0.85	2.940**	<0.01
Harmony relationship	4.27	0.92	4.19	0.99	1.201	0.230
Civic virtue	4.56	0.83	4.47	0.93	1.516	0.130

*p< .05 **p < .01 ***p< .001

5. Results of Hypothesis 4: The effectiveness of BSC management on the employee satisfaction

The effectiveness of BSC management on the employee satisfaction

The employee satisfaction was surveyed by the response to the electronic questionnaire from staff that work in the public hospital of the Ministry of Health and Welfare. The questionnaire consist of six dimensions about satisfaction with the job, the response rate is as followed.

Year	Response rate of all public hospitals (%)	Response rate of studied psychiatric hospital (%)
2011	68.5	90.3
2012	76.8	94.2
2013	77.9	92.8
2014	78.4	94.7
2015	75.8	93.7

Table 18 shows the results of survey of employee satisfaction from 2010 to 2015 and it shows that most of employee are satisfied with the domains of learning and growth, job condition, work climate and organization commitment, and are less satisfied with the domains of promotion opportunity and welfare.

Table 19 shows the results of survey of employee satisfaction from 2010 to 2015, there

are no significant difference between studied hospital and all psychiatric hospitals, and the domains of satisfaction are similar. These results are analyzed from the datafile of employee satisfaction.

Table 18. The survey of employee satisfaction on job of Studied psychiatric hospital from 2010 to 2015.

Domains	2010 N:374	2011 N:385	2012 N:454	2013 N:427	2014 N:455	2015 N:452
Job condition	3.35	3.32	3.27	3.39	3.37	3.46
Organization commitment	3.71	3.54	3.49	3.63	3.61	3.67
Working climate	3.53	3.44	3.44	3.54	3.51	3.64
Learning and growth	3.68	3.52	3.49	3.60	3.60	3.69
Promotion opportunity	3.14	3.02	3.01	3.19	3.22	3.31
Benefit and warfare	3.18	2.98	3.02	3.15	3.21	3.32

Table 19. The survey of employee satisfaction on job of all psychiatric hospitals from 2010 to 2015.

Domain	2010	2011	2012	2013	2014	2015
Job satisfaction	3.61	3.38	3.37	3.30	3.38	3.40
Organization commitment	3.65	3.50	3.48	3.46	3.48	3.50
Working climate	3.70	3.48	3.46	3.50	3.56	3.54
Learning and growth	3.62	3.45	3.46	3.44	3.47	3.45
Promotion opportunity	3.19	3.10	3.05	3.13	3.22	3.20
Benefit and warfare	3.14	3.05	2.98	3.09	3.20	3.18

After further analysis about the satisfaction of employee in 2014 and 2015, the results reveal that male staff is more satisfied with job than female; the staff with chief position is more satisfied than the staff of non-chief position; age above 40 years old is more satisfied with job; the satisfied score is lowest in the staff with university education level; the duration of service above 20 years and below 1 year has highest satisfied score. In addition, the physician is more satisfied with job than nursing staff.

6. The results of hypothesis 5: The effectiveness of BSC management on the financial growth

The comparison of financial outcome between psychiatric hospital with similar characteristic

Table 20 shows the difference of financial outcome and growth ratio in studied hospital and psychiatric hospitals with similar characteristic in Taiwan. The results show that the studied hospital had larger growth rate in financial outcome after implementation of BSC management. The Bali psychiatric hospital had adopted the BSC program as strategic management since 2014, it had positive growth rate compared to other hospitals. These results are analyzed from the datafile of financial revenue.

Table 20. The financial outcome and growth rate of studied hospital and similar psychiatric hospitals from 2010-2015. Thousand Taiwan dollars

Hospital	2010	2011	2012	2013	2014	2015
Tsao-Tun	659,998	695,870	710,298	710,322	735,311	760,952
Growth rate (%)		5.16	2.03	0.00	3.40	3.37
Tao-Yuan	770,115	778,963	770,194	784,101	783,051	792,342
Growth rate (%)		1.14	-1.14	1.77	-0.13	1.17
Chia-Nan	441,894	462,186	470,512	485,506	483,147	484,510
Growth rate (%)		4.39	1.77	3.09	-0.49	0.28

Bali	319,630	328,863	332,708	348,145	356,643	372,993
Growth rate (%)		2.81	1.16	4.43	2.38	4.38
Yuli	629,520	642,923	601,857	601,218	607,992	599,640
Growth rate (%)		2.08	-6.82	-0.11	1.11	-1.39

The facility and manpower of these psychiatric hospitals is as followed:

Tsao-Tun hospital: the studied hospital has 197 acute psychiatric beds, 750 chronic beds, 362 rehabilitation facility. Total 1209 beds. Number of employee is around 446.

Tao-Yuan hospital has 312 acute psychiatric beds, 424 chronic beds, 405 rehabilitation facility. Total 1241 beds. Number of employee is around 465.

Chia-Nan hospital has 100 acute psychiatric beds, 400 chronic beds, 312 rehabilitation facility. Total 812 beds. Number of employee is around 289

Bali hospital has 182 acute psychiatric beds, 318 chronic beds, 200 rehabilitation facility. Total 750 beds. Number of employee is around 396.

Yuli hospital has 68 acute psychiatric beds, 416 chronic beds, 1600 rehabilitation facility. Total 2500 beds. Number of employee is around 427.

Chapter Six: Discussion

1. The effectiveness of BSC management on quality indicators related to patient safety

1.1. The effectiveness of BSC management on the density of fall event

In psychiatric hospital, the event of patient fall and fall-related injury are very serious problems because they will inflict physical and psychological trauma on patients. These happenings are also give significant impact on the staff that take care for the patients with severe mental illness. The incident of fall event maybe different according to the characteristic of resident or patient, size of institution, environmental arrangement and ratio of staff-patient. The incidence of the fall events is ranged from 3 to 5 per 1000 patient days according to different characteristic of institution (Oliver, Healey, & Haines, 2010; P. A. Quigley et al., 2012).

In studied hospital the density of fall event is around 2.9- 3.9 per 1000 patient days. The causes of reported fall event are classified into four categories: that is due to (1). Medical conditions: related to medical disease or symptoms such as dizziness, imbalance, unsteady gait etc; these symptoms are found very frequently in the patients with severe mental illness; (2)Medication effect: such as side effect of antipsychotic including extrapyramidal

symptoms,

postural hypotension; most of psychotropic drug including antipsychotic, mood stabilizer and benzodiazepine will enhance the risk of fall in psychiatric patient; (3) Environmental factors; the unsafe environment and facility (4). Others: the incident happened due to the causes that are difficulty classified into above categories. The classification is similar with the previous research of Evans and colleague about long-term care institution. They had identified the risk factors related to the occurrence of fall event including impaired mental status, agitation and confusion; impaired physical condition including unsteady gait, muscle weakness and urinary incontinence or frequency, medication induced condition and the use of sedative medication. In addition, the patients' special need for assistance about daily life activity, and the history of fall event happened are also the risk factors to fall (Evans, Hodgkinson, Lambert, & Wood, 2001).

In the studied hospital, most of the patients' fall is due to medical illness or symptoms,

around 40%; the events happened in the daytime or night time, or during the night time when patients get up for toilet owing to the interruption of sleep. The place of fall event happened in the bathroom, dinner room or living room. And the fall event happened in the time of low ratio of nurse staff to patient. These data is similar with the data of long-term care institution.

The risk factors of fall can be summarized as patients' factors, environmental factors and staff attitude toward the adverse events. The effective intervention based on evidence to prevent the adverse events of fall consist of requirement of conductance of risk assessment about fall event with adequate predictive sensitivity, and the clinical judgment of physician and nurse based on the regular monitoring of the dynamic change of mental and physical condition of patient lived in the ward. The tool of risk assessment must be modified according to the characteristic of resident and the results analyzed from the data of fall event. Then the individualized preventive plan and the standardized care process based on the risk assessment must be tailored to prevent the fall event. In addition, the interdisciplinary multifactorial intervention program consist of alarm and alert system of environmental design and equipment of safe environment such as bracelets, bed alarm and toilet assistance is required. The education about how to use protective device and call for assistance should be provided for the patients. The more advanced training program such as exercise training program to enhance muscle strength that has been proved to be effective prevention strategy for fall of elder patients can be implemented to prevent the fall events (Cameron et al., 2012; Gowdy & Godfrey, 2003; Haralambous et al., 2010; Kolin, Minnier, Hale, Martin, & Thompson, 2010; P. Quigley, Neily, Watson, Wright, & Strobe, 2007; Stenberg & Wann-Hansson, 2011; Szymaniak, 2015). The most important issues is to establish the continuous improvement cycle and modification of intervention strategies according to the

results of data analyzed from the reporting system to decrease the happening.

In the patient safety reporting system of studied hospital, the events of fall should be reported for further inspection and will be arranged for RCA analysis or PDCA intervention for improvement. In the daily practice, when the patient admitted they will receive risk assessment about fall event during intake process, then followed by standardized care and regular monitoring about the change of general condition to prevent fall if their risk for fall is high. The implementation of action plan to prevent fall events will be conducted when the density of fall events is higher than the average level of participated psychiatric institutions in TCPI program or increased density compared to the results of previous year. The action plan was conducted every years because the density is high and the impact of fall-related injury is significant on the patient care.

In the implemented action plan under the framework of BSC management from 2011 to 2015, the following strategies were performed to prevent the adverse event of fall in studied hospital.

2011. Revise the risk assessment tools, standardize the reassessment process and establish individualized prevention strategies for specific patient. Implement a systemic prevention plan according to the results of data analysis.

Perform comprehensive inspection of environmental safety about facility and modeling the facility that is unsafe.

Establish standardized preventive care process and regular monitoring of the change of patients' condition.

2012: Arrange group physical exercise activity for the patients with different kind of function level to strengthen muscle power and to guide them to establish the self-arrangement of exercise activity as regular life activity to modify physical condition.

Pay more effort to the PDCA program to be executed by the ward that the incidence of fall events is high and more severe injury of falling accident were recorded.

2013: Extend education program to disseminate the evidence-bases knowledge and information about effective preventative strategies for all front-line staff.

Practice the intervention in the ward or for specific patients group and the intervention was followed by regular monitoring about the effectiveness and further modification of intervention strategies.

2014. Continuous improvement management of previous strategies including physical exercise, PDCA cycle, case study etc. focus on the failure of prevention in the patients that had been evaluated as high risk group and the patient that fall but had been assessed as low risk group.

Conduct intensive audit and monitoring about the results of intervention strategies.

2015: Design more detailed screening questionnaire and form the classification of risk level according to the data analysis, add dynamic assessment skill about progressive change

of general status for caring team to detect the early warning sign to prevent the adverse event of fall.

In the process of clinical practice of intervention strategies to prevent the fall event, the individualized assessment of risk factors and risk level was identified from the intake during admission, then the clinical judgment was formulated to invent specific preventive strategies to prevent the occurrence of fall according to personal characteristic and risk level. The incident of fall events should be reported to patient safety system, and the adverse events will be detailed analysis and the intervention management such as RCA, PDCA program should be conducted to find out the core factors related to the fall event for prevention of further happening. After the conductance of intervention strategies, the modification of preventive strategies will be discussed and tailored according to the reality situation to decrease the events.

Action plan to prevent the fall event under the BSC structure was performed every years, basic requirement was done following the structure, then the data of fall event was collected and analyzed to inspect the possible cause every month. The responsible team of action plan work together to discuss and invent the preventive strategy, then to evaluate the effectiveness of strategies and identify the limitation of prevention plan after been executed for a period of time. The team especially focus on high risk patient group such as faller more than twice, and provide physical exercise training to strengthen the muscle power to reduce

frequency of fall or fall related injury.

The results revealed that the density of fall improved in 2011 and 2012 under the management program of BSC, but the density of fall event increased progressively from 2013 to 2015. The successful factors are related to the teamwork cooperation and sustained intervention maneuver. The factors related to failure to attain the benchmarking goal consisted of following: (1). characteristic of patients changed by the time progress, the patients get older and physical disease increased, their physical strength decreased; (2). Ineffectiveness of organization support and senior leader commitment with the executive team to coordinate the resource for execution of prevention strategies; (3). the deficiency of power controlling system due to inadequate rank position of leader of executive team.

In the BSC structure, the continuous quality improvement management to establish the standardized process in the care for the patient with high risk level of fall event was performed under regular monitoring during the conductance of action plan. In addition, the arrangement of physical exercise training of muscle power for patients with different function level was conducted to prevent the fall-related injury. The evidence-based knowledge and information acquired from the PDCA cycle for improvement was cumulated to modify the prevention program. The interdisciplinary coordination across different perspectives was established to prevent the fall event during the process of implementation of action plan under the BSC framework.

The density of fall events increase progressively since 2013, the causes of increased density maybe related to the following factors: (1). the change of superintendent, this may influence the management principle and weighting priorities on the performance of BSC framework. (2). the surveillance of the reporting the accident events are intensified that may influence to improve the reporting accuracy and increase the reported events. (3). It is difficulty to disseminate the knowledge to all clinical teams and change their attitude toward patient safety due to their thinking pattern; (4). Difficulty in execution of preventive strategies, that maybe due to limitation of position power of leader of action plan and the inadequate support from senior leader. (5). the deterioration of global physical condition of patient will influence them more vulnerable to the happening of fall event, especially the repetitive fall. (6). the ratio of staff to patient is too low to care the patient with high risk of repetitive fall due to the concern of cost. But in general, the fall-related injury decreases even the increased the density of fall event, maybe due to the training of physical strength according to patients characteristic and their function level.

The density of fall event decreases in the initial implementation of action plan has demonstrated to be positive effectiveness of intervention strategies on the quality of care related to patient safety, but density increases even under the executive action plan, so the management strategy of action plan under BSC structure is partial positive effectiveness on the outcome of density of fall event.

1.2. The effectiveness of BSC management on the density of self-injury event

Most of patient that admitted to acute ward in studied hospital are the patient diagnosed with severe mental illness, they are diagnosed as schizophrenia, bipolar mood disorder, major depression, organic mental disorder, dementia, autistic disorder or intellectual disability. The incident of deliberate self-harm and suicidal attempt is high in these patients that are all have high RR for self-harm than the general population. The related factors are associated with unstable mental status, the influence of psychotic symptoms such as delusion or hallucination; inadequate supportive connection with family member, or negative thought and hopeless about the future life. Sometimes they make self-harm behavior to express their inner distress or just impulsive to do or follow the commanding auditory hallucination, the condition is resulted from the difficulty in communication about their distress and feeling related to the thought of self-harm behaviors effectively (Daffern et al., 2010; Gunnell et al., 2012; Sansone, Gaither, & Songer, 2002; Taylor, Hutton, & Wood, 2015).

In studied hospital, the characteristic of patient that had make self-harm behavior is male gender, around 60 %, average age is around 40 years old. The patient get injury after self-harm behavior around 60%. The related factors influenced the self-harm behavior occurred under the influence of disease status is more than emotional factors, some patients harm themselves repetitively, around 30%; most happening occurred in the patients that have been hospitalized more than twice.

The place of making deliberate self-harm can be divide into public and private place, the possibility to get injury is much more in private situation. There are around 30% of events happened in the time of night shift when the ratio of nursing staff to patient is low.

The strategies based on evidence to reduce the risk of self-harm behavior including identification of high risk patients, early detection of warning sign and comprehensive assessment of the change of mental status and psychological distress influence patients behavior. Psychosocial intervention to provide skill training about problems-solving method for patient to coping with the symptoms and inner distress is very important to decrease self-harm behavior. If these method failed, the evidence-based pharmacotherapy should be added. In general, the multimodal prevention activity and intensive inspection and monitoring of environment safety are the major intervention to decrease the density of self-harm (Abidin et al., 2013; Karman, Kool, Poslawsky, & van Meijel, 2015; Kool, van Meijel, Koekkoek, van der Bijl, & Kerkhof, 2014; O'Shea, Picchioni, Mason, Sugarman, & Dickens, 2014; Sakinofsky, 2014).

During the implementation of action plan under the framework of BSC management from 2011 to 2015, the following strategies was invented to prevent the adverse event of self-harm behavior.

2011. Establish the clinical pathway and therapeutic process of acute ward including standardized intake process and careful assessment, heighten frequency of

observation and regular monitoring of mental status, involve with family member to pay more attention to their illness, focus on environmental safety, improve team communication with regular team meeting, provide adequate medication and behavioral management.

Intensive training program for the frontline caring staff about how to detect the antecedent and risk situation related to self-harm behavior to enhance alertness and sensitivity to the risk situation, use the assessment scale for interdisciplinary cooperation to build up safety plan to reduce the adverse events of self-harm.

2012. Factual knowledge and skill about dynamic assessment provided to all staff to pay more attention to the patients with higher risk, educate the comprehensive psychiatric evaluation to decrease the judgment gap about the risk situation.

Establish communication skill and problems-solving skill to enhance expression of distress and psychosocial stress patient faced to reduce the events of self-harm.

In the BSC structure, the continuous quality improvement management to establish the standardized process to prevent self-harm event with following steps: comprehensive assessment of risk factors, dynamic evaluation of the change of mental condition, direct exploration of self-harm plan when the warning sign emerged, strengthen the protective factors to encourage the alternative choice, determine the risk level and setting appropriate preventive treatment plan under team coordination, documented the treatment plan and

instruction for all caring staff to observe the change of status.

The results of BSC management revealed that the density of self-injury event decreased in 2011 and 2012, but increased from 2013 to 2015 under the BSC management. In the execution of action plan, the regular analysis of happening and discussion about the events were done in the monitoring meeting; then the standardized preventive strategies will be built up to prevent the happening of adverse events. The most important procedure is to disseminate the knowledge and skill for all frontline staff to do exactly when strategies established, thereafter to check the deviance of outcome and revise the prevention strategies according to the evaluation of the effectiveness of intervention. After 2 years effort to establish the standard process, the density of self-injury decreases. But the density of self-injury increases when discontinuance of action plan, and the density increases progressively. The causes of this phenomenon maybe due to the characteristic of patients changed, increase the amount of new staff unfamiliar with the process, and the weighting priority of organization changed on the principal goal of patient safety. According to the results of yearly report, the intervention strategy to manage this indicators is

discontinued because the density of self-injury is not higher than average level of national TCPI under comparison.

The implementation of action plan has positive effectiveness on the decrease of the density, the density increases when the action plan is discontinued, so the BSC management

has positive effectiveness on this indicators, the density of self-injury event.

1.3. The effectiveness of BSC management on the density of violence event

The incidence of violent behavior is high in psychiatric patient at acute stage, around 1 in 5 patients commit the violent act in acute psychiatric ward. According to the previous researches, the patients that commit violent behavior are more likely to be male gender, has the diagnosis of schizophrenia, and the patient with alcohol abuse. The patients that had been admitted involuntary and the patients with personality disorder, especially patient that demonstrate the inadequate adherence with treatment, these patient has high risk to commit violent behavior.

The psychiatric patients that have neurobiological insults such as organic mental disorder, epilepsy, and young male with poor judgment ability or inadequate self-regulation skill to control impulse have more violent behavior. The behaviors are happened mostly during the initial stage of hospitalization when mental status is unstable (Baeza et al., 2013; Dack, Ross, Papadopoulos, Stewart, & Bowers, 2013; Urheim et al., 2014; van Dongen, Buck, & van Marle, 2012).

In the studied hospital, the violent event was committed by the male patient that had been diagnosed as major psychosis, had dual diagnosis that psychotic patients comorbid with substance abuse, had previous history of aggressive behavior, and had lower cognitive function. The physical aggression is associated with psychotic symptoms such as hallucination with commanding or commenting content or persecutory delusion. The violent behaviors maybe due to the response to the perceived provoking stimuli by other patients'

behavior or their verbal expression that had been thought as threatening. Patient express their anger toward the limitation of freedom by staff or they felt been teased or been provoked by staff giving order to them with violent behaviors. These behaviors are mostly occurred in unstructured time in the ward, or in the time giving medication or change of night shifting or in the situation with low staff-to-patient ratio.

According to the researches, the violent behavior of psychiatric patients is related to the psychotic behaviors, mood variability, antisocial tendency, impulsive behaviors with inadequate self-control. Violent behaviors increase when the patients faced more psychosocial stressors and acute life events or change of therapist. The antecedent situation of violent behavior is strongly related with staff-patient interaction such as restricting the freedom of activity or denying the request of patients.

The prevention strategies based on researches to reduce the risk of violent behaviors and the management of violent behaviors is as followed: recognition of early sign, comprehensive dynamic assessment of mental status, comprehensive team management and regular review, formal arrangement of supportive organization structure and supervision of behavioral intention, behavioral treatment to facilitate patients to establish self-management skill and adequate pharmacotherapy to decrease the arousal stimuli of environment and trauma-focus intervention for the patient s with personality disorder (Desmarais, Nicholls, Wilson, & Brink, 2012; Horowitz, Guyer, & Sanders, 2015; McCann,

Baird, & Muir-Cochrane, 2014; McDermott & Holoyda, 2014; Neufeld, Perlman, & Hirdes, 2012; Papadopoulos et al., 2012; Phillips, Stargatt, & Fisher, 2011)

In the implemented action plan under the framework of BSC management from 2011 to 2015, the following strategies were invented to prevent the adverse event of violent behavior.

2011. Establish the clinical pathway of comprehensive care in acute ward including standardized intake process and careful assessment, dynamic evaluation of fluctuation of mental status, regular observation and evaluation of the change of patients' mental status, involve with patient to make behavioral contract focus on self-control of behavior, provided psychosocial therapy for patients to enhance problems solving skill, install regular team meeting to rapid response to the change of mental status and to provide adequate medication and behavioral management.

Intensive training program for the frontline caring staff about how to detect the antecedent sign of impending aggressive behavior, use standard scenario to assess the risk situation related to aggressive behavior and provided education about adequate intervention skill to reduce the adverse events of aggressive behavior.

2012. Knowledge and skill about dynamic assessment of violent behavior was provided to all staff to pay more attention to the patients with more risk factors, build up the standardized process to provide individualized behavioral modeling therapy and

arrangement of soft environmental stimuli to decrease arousal from stimuli to reduce the adverse events of violent behavior.

In the BSC structure, the continuous quality improvement management to establish the standardized process by clinical pathway to take care of the patients with high risk to commit violent behavior that patient with different diagnosis lived in the acute care facility. In addition, under the coordination of action plans between different perspectives of BSC to enhance staff's engagement with care program to acquire the advanced caring skill to reduce the adverse events of violent behaviors.

The results of BSC management revealed that the density of violent event decreases in 2011, 2012 and 2013, but increases from 2014 to 2015. Under the BSC management, in the execution of action plan, the regular analysis of happening and discussion about the cause related to the events; then to build up the standardized preventive strategies to decrease the happening of adverse events. Establish comprehensive education program to engage all frontline staff to provide skill training for the patients to coping with stressor from psychiatric illness. In the regular team meeting discussion to find out the problems when the prevention maneuver failed, and revise the prevention strategies if significant deviance persisted.

After 2 years effort to establish the standard process, the density of violent event decreases. But the density of violent event increases when cessation of the action plan. The

causes to the increased density maybe due to (1). The change of patients characteristic and increase the number of patients with dual diagnosis; (2). Increase of new staff unfamiliar with the skill to manage the high risk level of violent patients; (3). Difficulty in adopt the adequate method of dynamic assessment about patients' mental status due to inadequate training. (4). Difficulty to establish problem-solving skill to manage inner impulse due to poor insight about his problems and high severity of illness hospitalized in the studied psychiatric hospital.

According to the results, the indicators deteriorated when didn't place adequate weighting on the action plan to prevent the accident of violence. The density of events cannot be maintained at decreasing trend when cessation of action plan. But it can be maintained at the level below the average level of national TCPI under comparison. The change of indicators is correlated with the execution of action plan according to the results of analysis. The BSC management has positive effectiveness on the outcome of indicators, the density of violent event.

1.4. The effectiveness of BSC management on the density of involuntary restraint event

In psychiatric hospital, the restrain and seclusion were used frequently as the strategies to prevent negative events happened to influence the treatment outcome, or as a therapeutic management of behavioral disturbance to control agitation or inadequate behavior. These coercive measures of restraint are the last resort measures to be use in the emergency situation when harm to self or others will occurred immediately in the caring of illness (Beghi, Peroni, Gabola, Rossetti, & Cornaggia, 2013).

From the point of view of patient, there are multiple negative consequence was Reported after been restrained and secluded such as psychological trauma, physical harm, and negative attitude toward the treatment. These measures was associated with increased medical cost and may engender the legal problems if used these maneuver inappropriately (Bilanakis, Kalampokis, Christou, & Peritogiannis, 2010; Georgieva, Mulder, & Whittington, 2012; Knutzen et al., 2011; Raboch et al., 2010).

The principle of use of the restraint and seclusion was different according to the characteristic of residents, size of institution and patient-to staff ratio. In addition, the length of time to restrain the patient in different situation maybe different due to physician and the staffs' thought about these maneuvers.

In the studied hospital, the restraint and seclusion were used mostly in the situation when patient commit violent or destructive behavior, or emergence of agitation with threatening behaviors. It was also used in the situation to prevent the happening of adverse

events such self-harm.

The effective program based on evidence to reduce events of restraint and seclusion including the education for frontline staff and physician about legal regulation about the adequate situation to use these maneuvers and declare the organization value to apply system-wide plan to reduce the restraint maneuver. Another important strategies that are proved to be effective are to reduce the gap between staff's attitude and patient experience. The utilization of alternative treatment maneuver to reduce behavioral disturbance of patients such as enhancement of their coping skill for self-management of emotional disturbance is suggested (Donat, 2003; Duxbury, 2002; El-Badri & Mellsop, 2008; Gagnon, Desmartis, Dipankui, Gagnon, & St-Pierre, 2013; Gudjonsson, Rabe-Hesketh, & Szmukler, 2004; Kontio et al., 2012; Ling, Cleverley, & Perivolaris, 2015).

In the implemented action plan under the BSC management structure from 2011 to 2015, the following strategies was invented to reduce the adverse event of restraint in studied hospital.

2012. Announce the organization value and advocacy the policy about adequate use of restraint maneuvers.

Encourage staff to experience the process about been restrained to enhance the empathetic reaction toward the patients' experience about these coercive maneuvers.

Remind the legal regulation about restraint to establish pre-thought about make the

decision about these coercive measure.

2013. Focus on the analysis of the frequency of patient's problems that been restrained and the use frequency of different physicians to find out the inadequacy to build up the principle to reduce number of episodes of restraint.

Provide education and training program for staff to establish patients' coping skill to manage their emotional and behavioral problems to reduce the episode of been restrained.

2015. Implement the alternative strategies about management of the emotional and aggressive behaviors happened, monitoring the inappropriate use of these measure and correct them.

Intensify the problems-solving therapy for the patients to establish the coping skill to manage their psychotic disturbance.

In the BSC structure, the continuous quality improvement management to reduce the density of restraints and length of time of restraints was performed in the design of action plan. The results revealed that the density decreases in 2011, 2012, 2013 and 2015 compared to 2010 when the BSC management had not been established. The density increases in 2014 when the action plan was stopped after the improvement of density had been attained. The density decreases under comparison between 2013 and 2012, and between 2015 and 2014 when the continuous implementation of action plan to prevent

restraint event. The increased density of involuntary restrain maybe related to (1). The physician attitude toward the involuntary restraint and seclusion; (2). Lack of adequate alternative strategies to manage the problematic behavior of patients even after the intensive education for the front-line staff; (3).Low ratio of staff to patient in some duty time to take care of difficulty patients. (4). Difficulty in utilization of standardized process in the care of the patient with high risk level of aggressive tendency due to too many severe and difficulty patient get together in the same ward; (5). The density increases maybe due to inadequate power control and monitoring without BSC management structure.

The action plan conducted in the BSC management structure has positive effectiveness on this indicators, but there are some difficulty to maintain at low density if the action plan had been stopped. It need more time to maintain the established standardized process at stable condition.

1.5. The effectiveness of BSC management on the density of elopement event

Elopement is defined as patient leave hospital without return back or leave against the medical advice. It is a serious events when happened in psychiatric hospital because the following consequence maybe inflict devastating effect on patient, caring team and organization.

When patient leave hospital without permission, some patient will commit suicide or harm to others, sometimes they may expose themselves in high risk situation due to their impairment of cognitive function and limited judgment capability. The influence on caring team is that the events may give negative impact on their confidence about their treatment efficacy. In addition, these events will make the organization to get the negative reputation about their quality of care and inadequate delivery of internal process to care the patient in the ward (Brook, Hilty, Liu, Hu, & Frye, 2006; Brumbles & Meister, 2013; MacAlister, 2013; Molnar, Keitner, & Swindall, 1985; Rozovsky & Rozovsky, 1986)

According to the analysis of events and deep exploration interview about the patients why he or she make the decision to leave hospital against the medical advice in studied hospital. The characteristic feature of elopement event in studied hospital is mostly found in the patients of young age, male gender with impulsive trait. They were detected to be with poor insight about their illness or thought that there are no need for treatment, and they felt bored during hospital stay and thought that they were trapped in hospital environment, so they leave by themselves. These characteristic is similar with the previous

researches. Most of events happened in some specific situation such as the patient had the permission to go outside of the ward for internist consultation, or attending rehabilitation training activity. They sometimes make the decision under the intensive impulse without considering behavioral consequence or they just have the opportunity to leave when staff's lapse of attention (Bowers, L., et al 1999b). Some patients reported that they had planned to leave because they eager to go home, some patients say that they had emergence issues to solve, or they didn't want to stay in hospital because the change of the relationship with family, they worry to be abandoned. Negative satisfaction with the hospital treatment and the increased tension in locked door during the hospitalization period that patient had suffered from severe distress resulted from their symptoms. In these conditions, they leave without permission to search for free space to relieve their tension and to protect their personal space (Bowers, Alexander, & Gaskell, 2003; Moore, Algase, Powell-Cope, Applegarth, & Beattie, 2009; Papovich, 1994; Richmond, Dandridge, & Jones, 1991; Smith, 2012; Williams, 2011).

The effective intervention to prevent the elopement in psychiatric hospital consist of early detection of antecedent sign and standardized checking process when transition of patients for different treatment. The adaptation of Team resource management is effective to monitoring the happening situation and blocking the possible precipitating cause to leave hospital against the advice. To focus on the emergence of the absconding sign and clinical

presentation, the surrounding person provide supportive remark for their emotional distress and make debriefing to reduce the tension in the TRM framework will help them work through the crisis situation (Bowers, Simpson, & Alexander, 2005; Moore et al., 2009; Muir-Cochrane, Mosel, Gerace, Esterman, & Bowers, 2011).

During the process of implementation of action plan in BSC management from 2011 to 2015, the following strategies was invented to prevent the adverse event of elopement. The action plan is focus on evaluation and prevention of chain reaction of antecedent event.

2011. Provide education for frontline staff to detect the antecedent sign and risk situation.

Design the assessment scale for interdisciplinary cooperation to evaluate patient's condition and maintain regular monitoring, especially focus on the transition period.

Standardize the monitoring procedure to check patient's condition when the transition of activity of patient or change the place of activity to assure the safety.

2012. Training the staff about dynamic assessment to pay more attention to the change of patient's mental status, relationship with family, or interaction with other patients.

Provide uniform for the patient attending rehabilitative activity to enhance the alertness of caring team and the quick awareness when the elopement event happened.

2013. Team resource management to establish group membership within patients group to enhance awareness of personal condition and recognition of the change of behavior in

the same patient group to prevent the adverse event.

In the BSC structure, the continuous quality improvement management by regular analysis of happening and deep exploration of patients' thought to invent the preventive strategies to decrease the elopement events. The PDCA, RCA and quality improvement program was done for every elopement case reported to patient safety system, then disseminate the knowledge and information acquired from the analysis to the clinical caring team to build up the standardized prevention process in risk situation. The high risk situation is in the condition when patient was brought to consult internist for their comorbid illness and when they attending rehabilitation activity. The regular audit, monitoring and feedback about the causes to make patient leave hospital without permission should be done to modify the deviance from the process. The sensitivity of staff toward the high risk situation will be enhanced to prevent the elopement event after these processes. The results reveal that the density of elopement event is decreased after the implementation of BSC management and maintain at stationary level. The BSC management has positive effectiveness on the outcome of indicators, density of the elopement event.

1.6. The effectiveness of BSC management on the density of discharged against medical

advice event

The patient that self-discharged against the medical advice (AAD) or make decision about their treatment by himself, had detrimental health outcome, and will engender the readmission, fast deterioration of function and increased healthcare cost. These patients may committed suicide or harm to others after discharged by themselves. The source of frustration resulted from negative consequence due to AAD will impact the capability of the care team significantly (Brush & Kaelbling, 1963; Kuo et al., 2010; Pages et al., 1998; Sclar & Robison, 2010).

The characteristic feature of discharged against the medical advice is younger age, male gender, substance or alcohol abuser, comorbid with personality disturbance, and history of AAD. The patient discharged against the advice maybe due to the feeling of stigmatized with psychiatric illness; thought that the hospitalization is a punishment to him; or they are unprepared for the hospitalization. The pessimistic thought about the treatment outcome, poor insight about illness, or had financial or insurance problems will lead the premature discharge. These events are happened in the first two weeks of hospitalization. They demand discharged by themselves due to dissatisfaction with therapeutic environment that is not matched with their expectation, or they didn't trust on the hospital environment and ask for discharge due to lack of adequate knowledge about therapeutic process. Psychiatric patients that are resistant to recognize their

illness and think that there are no reason to be detented in hospital will leave the hospital if they have the opportunity to go home. Single, unmarried status, antisocial and disruptive interpersonal pattern are prone to be against the medical advice and leave by himself.

Inadequate communication pattern of physician and the failure to orient the patient to hospitalization to establish supportive relationship may cause incomplete treatment. If without adequate arrangement of supportive resource or discharged care when they discharged against to the advice, these patient is frequently readmitted into hospital owing to deteriorated condition, the situation engender another pattern of revolving door of psychiatric patient treatment (Dalrymple & Fata, 1993; Duffy, 1990; Manuel, Gandy, & Rieker, 2015).

In studied hospital, the characteristic of patient discharged against the medical advice is young age, especially the adolescent, the parents concern about the negative influence of psychiatric hospitalization; first time admission, male gender, alcohol abuser, and inadequate expectation or preparedness for the treatment. It is similar with the results of previous researches.

The effective strategies to prevent the premature discharge including comprehensive assessment about patients' understanding and expectation about the treatment process; provision of clear education about treatment plan, provision of safe environment and

warm support, rapid establishment of trustful rapport to assist adaptation in hospital environment (Brook et al., 2006; Targum, Capodanno, Hoffman, & Foudraine, 1982; Wheeler, Beck, Manderino, Tackett-Nelson, & Gamache, 1984)

During the implementation of action plan of BSC management structure from 2011 to 2015, the following strategies were invented to prevent the adverse event of discharged against the medical advice.

2012. Implement the protocol for new patients been admitted, especially for the patients with high probability to discharge against medical advice such as adolescent, first admission, poor insight, uncompliant patient and substance abuser. Provide education about the treatment modality, process and estimated duration for patients and their family.

Establish standardized intake process and encourage staff to advocate patient to receive standard treatment and hospital stay to improve mental illness.

Provide intensive training program for the frontline professional and nursing staff to establish trust relationship and rapport to decrease the events of discharge against medical advice.

2013. Provide education about knowledge and skill for all staff to self-advancement of relationship building with new patients as standardized process to modify patients' attitude and intention to discharge against medical advice.

Arrange adequate resource and community treatment plan for the patient of possible premature discharge and to arrange adequate outreaching community treatment plan for them when they discharged.

In the BSC structure, the continuous quality improvement management included in action plan is as followed: to build up guideline to enhance staff's engagement with treatment program and commitment in advanced training program to provide supportive interpersonal communication skill to assist patients' adjustment with therapeutic environment smoothly. The physician and his team must quick response to the increased tendency to leave against the advice, they can persuade the patient and reframe patients' cognition and attitude with adequate therapeutic skill. In addition, the systemic thinking was accumulated to provide further arrangement of community resource for continuity of care as alternative treatment modality to reduce the adverse events happened when the patient discharged prematurely.

The regular analysis of happening and discussion about every case of discharged against the advice to build up standardized preventive strategies and tailored the analysis results to an individualized treatment plan to decrease the event. The dynamic analysis about the failed case to study how to improve the process of intake and evaluate the fluctuation of mental status to predict the risk; then invite patient and their family to participate in treatment plan and sharing decision making. In the same time, try to provide

education about negative consequence of discharge against the advice for them to make appropriate decision. The results revealed that the density of discharged against the advice event decreases in 2011, 2014 and 2015 with significant difference, the density increases in 2013 compared to 2010 that BSC management had not been implemented. The comparison of indicator is improved between 2012 and 2011, between 2013 and 2012 after the performance of action plan under BSC management, but density of AAD increases after cessation of action plan in 2014 and 2015. The causes related to the increase in the density of discharged against the advice event maybe due to (1). Changed characteristic of the admitted patient group, difficulty patient increased; (2). The patients with dual diagnosis increased; (3). Inadequate training for frontline staff resulted in immature skill and preparation for high risk patient; (4). Inadequate environment arrangement to modify the intention of patient with high risk to discharge prematurely due to inappropriate commitment with the intervention modality.

The action plan in the strategic management under BSC structure is correlated with the decreased density of indicator according to the results of analysis. The BSC has positive effectiveness on the outcome of indicators, discharged against the advice event.

2. The effectiveness of BSC management on the patient safety culture

The hospital that has been studied adopt three hierarchy of organization design follow the

BSC framework to conduct strategic management. The basic level is executive team, should collect data for analysis and create intervention strategies to solve the deviance from strategic goal; higher hierarchy is the supervision team, that was designed to monitor the progression of action plan and give suggestion to executive team for them to invent the adequate strategies based on the data analysis; highest hierarchy is superintendent-leading committee to organize all action plans to build up the organization direction and shape the learning culture. The patient safety is weighed as highest priority of the organization goal and represent the quality of care in studied hospital, these indicators are the major performance outcome of the internal process perspective in the BSC structure.

The action plans related to the quality improvement management were implemented in the

internal process perspective of BSC focus on the patient safety. In our research, the results about quality indicators related to patient safety (TCPI) are improved when action plans were conducted after implement of BSC management program. During the process of sustain execution of action plan to maintain better quality of care, we also examine the change of patient safety culture and the developmental trend of safety culture score. The

significant change is found in the domains of teamwork cooperation, safety climate, perception of hospital management, working condition, altruism and organization commitment in 2014 compared to 2013. The significant change is found in the domain of job satisfaction, perception of hospital management and commitment in 2015 compared to 2014, it is deteriorated in these domains in 2015. The survey score of patient safety culture is highest in several domains in 2014, but the average score of some domains deteriorated in 2015, especially in job satisfaction and organization commitment. The scores of many domains are higher than the average level of all public hospitals group and all psychiatric hospital group of Ministry of health and welfare. The difference in the item surveyed may be due to the different sample in the organization or different experience about patient safety event.

The average score of patient safety culture in 2014, the female gender is higher than male,

41-50 age group is higher than other age group, the staff with more education years is higher in average score, staff of emergency room is higher than other department, the staff with chief position is higher than the staff of other position, the group that working duration below 6 months in studied organization has the highest score. These results reveal that the leaders have deeply experienced the organization policy and the staff that deeply involve with the clinical service have positive change on their attitude toward the issues of patient

safety. After the conductance of BSC management, the staff can perceive the hospital management and have more engagement with the organization vision. The culture of altruism behaviors has been established during the process of teamwork cooperation. General speaking, the global weighting on the climate of patient safety and working condition improved.

Some expressed opinions are found in the domains related to the environment and facility around 15, manpower shortage 13, process modification 22, and team education 8. Their suggestion and expectation to change were collected from the questionnaire. The further improvement in safety environment facility, teamwork and leader style were suggested.

Patient safety culture is correlated with multiple factors including leadership, accountability, and teamwork communication, organization policy, reporting system and quality improvement management. In our research, we just present the results of cross-section evaluation and comparison between different years extracted from the data file, there are limited analysis about the factors correlated with the change of patient safety culture (DiCuccio, 2015; Ford, Silvera, Kazley, Diana, & Huerta, 2016; Thomas-Hawkins & Flynn, 2015).

The culture is formed and changed due to accumulation of many action including organization policy, working pattern and interdisciplinary communication, systemic thinking

process of staff, that are embedded in different level and within subgroup. According to previous researches, safety culture of employee is the major drive to enhance the quality of care. The effective intervention to enhance the safety culture consisted of following strategies.

Leader walk- around and engage frontline care-giver to commit with organization vision can lead the change of staff to develop the value-base and patient-focus service. The direct communication to break through the barrier is positively associated with the change of patient safety culture. The executive walk-round of leader is to invite the staff participate in problems-solving process and provide wisdom and knowledge to manage the challenge, not just surveillance of the progress failure. In addition, leader walk-round can focus on the systemic problems and provide resource to find out the specific problems and tackle the resistance to change. During the supervision relationship, the leader can transfer the organization value to staff for advanced identification of organization. These process and supervision program will increase the staff morale and change organization climate (Clay-Williams, Nosrati, Cunningham, Hillman, & Braithwaite, 2014; Manojlovich et al., 2014; Martin et al., 2014). The utilization of step-by step structuralized training curricula and workshop about patient safety can lead enhancement of awareness of safety problems. In the training program, the exploration of micro-systemic problems for discussion can decrease the inter-professional strain and conflict that hinder the process to attain the goal

(Braddock et al., 2015; Hill, Roberts, Alderson, & Gale, 2015). The Team resource management is an effective tool to enhance the sensitivity about patient safety, the framework of TRM consisted of leadership, situation monitoring, mutual support and communication training to build up team coherence. The training program followed by regular systemic audit and knowledge sharing is an effective intervention to improve the culture of patient safety in organization (Hsu et al., 2014).

The effectiveness of BSC management according to the results of researches consist of Following factors: transform the vision to strategy, engage with communication to align the resource, manger involvement in execution and reliable monitoring for revision of strategies. The change of organization culture such as learning culture for continuous improvement is established and can be a represent of organization change (Hoffmann et al., 2014; Simons et al., 2015; Weaver et al., 2013; Weller, Boyd, & Cumin, 2014).

During the process of implementation and execution of action plan under the framework of BSC management, the team member must cooperate to collect the data, analyze the data, try to find out the problems and create the intervention strategies to correct the deviance. In the face of failure, they should work together to break through the difficulty and try another strategies again. The resilience and team work cooperation are remodeled during the process.

In the BSC management structure, the diversify strategies are encouraged, the flexibility

And innovation of strategies are permitted to solve the problems. During these process of intervention, the pilot experiment of action plan can be initiated and generalized to other units if succeed. The personal growth and achievement from learning is enhanced from positive results of outcome during the intervention of patient safety. The characteristic of conductance process of action plan under the BSC management structure including the leader engagement and supervision, education program and training curricula, teamwork collaboration and communication, similar with the researches. The modulation of the core element in the BSC management has positive effectiveness on the change of patient safety culture.

3. The effectiveness of BSC management on inpatient satisfaction

In our research, the satisfaction of inpatient is significant improved in 2015 compared to 2014, 2013 and 2012 in all domains consisted of satisfaction level toward hospital environment, professional attitude, service process, personal right, communication and safety, and the treatment outcome.

After statistical analysis, the results revealed that age, times of hospitalization and duration of hospitalization have significant association with the inpatient satisfaction. According to prervious research, the demographic data had no significant influence on the patient satisfaction (Aubin et al., 2012).

The patient satisfaction is associated with service quality including physical quality, interaction quality and outcome quality. Treatment provided with patient-centered care focus on the whole person to deliver the service according to individualized preference under social context can lead to positive satisfaction (Dwamena et al., 2012). The major components related to the patient satisfaction are the treatment outcome and the easy access to the treatment. In the treatment of psychotic patients such as schizophrenia, the effectiveness of medication is not close related to the life quality and is not significant associated with the positive satisfaction. Therapist competence and their compliance with the treatment guideline are the determinate factors with the positive satisfaction (Fervaha, Agid, Takeuchi, Foussias, & Remington, 2014). The physician-patient relationship and the

empathetic attitude to relieve patient anxiety can enhance patient satisfaction, especially the communication behavior such as friendliness, provision of disease–related information and engage discussion with patient about illness to assist making decision. Respect to patients' dignity and preference from professional during the process of care and treatment is the most important factors with the positive satisfaction of patient (Olson, Fields, & Windish, 2015). Based on Parasuraman's construct, the perceived service quality compared to their initial expectation lead to patient satisfaction. If patient could anticipate the treatment plan and outcome, and they can communicate about their need and expectation related to the care they received, the satisfaction will be enhanced. If patient can involve with the decision of treatment and has more understanding about the treatment process, the satisfaction increases (Aiken et al., 2012). Functional improvement and the independent living skill improved after intervention service are positive associated with satisfaction in the research of long-term institution (Davies et al., 2015). But if they had experienced the coercive measure during the hospitalization, the negative impact on satisfaction will increase (Sorra, Khanna, Dyer, Mardon, & Famolaro, 2012).

Based on the previous researches, the strategic goal of studied hospital is focus on the positive associated factors with patient satisfaction including establishment of safety environment, engagement with supportive communication and intensive treatment with effective outcome. From the perspective of internal process, the strategic goal is focus on

the quality related to patient safety to reduce adverse event and to establish safer living environment in hospital. In the action plan to reduce the discharge against medical advice, communication enhancement was implemented; in the action plan to reduce restraint, the negative factors were removed and try to establish the atmosphere to respect patients' ability to control by himself and encourage communication; in the action plan of rehabilitation program, the functional enhancement and recovery program were performed to enhance independent skill and quality of life; in the action plan of health promotion program, education about how to care for personal health was provided. Coordination of these action plans in the implementation of BSC management was executed year by year, the delicate care for the patients' need was established in daily practice. The interdisciplinary team activity was arranged to provide more opportunity of interaction between professional and patients to activate the change of patients' life pattern. The therapeutic team adopt the quality improvement program to reduce the occurrence of adverse events and try any method to establish standardized procedure to maintain high quality of care. These components related to the increased patient satisfaction was conducted in the action plan, the results are similar with the results of effective management on patient satisfaction of previous research. The intervention activities executed under the BSC management framework have positive effectiveness on the patient satisfaction. But which factors and the weighting of influence factors and their correlation

relationship of these factors still need further studied by further design of research method.

4. The effectiveness of BSC management on the employee satisfaction

The results of our research reveal the employee in studied hospital is more satisfied with job environment and working climate, highest in the domain of personal growth, and had positive organization commitment. The domains that less satisfied consisted of promotion opportunity and benefit and welfare system of organization.

Further analysis of the every item in the domains of job satisfaction revealed as followed:

The employee had higher satisfaction in their opportunity to provide service for patients and stable job condition in the domain of job environment; had more satisfaction with clear vision and mission of organization in the domain of organization commitment; more satisfaction with interpersonal relationship with colleague and supervisors' support in the domain of working climate; had more satisfaction with the on-job training and resource provided in the domain of learning and growth. The part of less satisfied consist of the opportunity of promotion and welfare provided by organization.

The 40-49 aged and above 50 years old are more satisfied with job than 20-29 aged and 30-39 aged; education of university level has lower satisfaction with job than other educational level, position as chief is more satisfied, and service years on present job below I year and above 20 years are more satisfied with the job.

In the rapid change of healthcare environment, the staff had faced significant stress from

job that needs high productivity and efficiency. According to the previous research, the adequate stress management on the job, positive supervisor's support and good relationship with colleague are positive associated with job satisfaction. The leadership style to inspire a shared vision of organization, to challenge the process, to model the practice way, to active the action, and to connect with the staff's affection can enhance the job satisfaction of employee. The participation in teamwork cooperation is positive associated with employee satisfaction. The clear role definition under supportive work environment, and joyful on the job performance will motivate employee engage with job and get more satisfaction, then the burnout rate decreases (Shi, Sears, Coberley, & Pope, 2013). Perceived control on job performance and self-efficacy can lead success in management of faced difficulty(Di Tecco & Borgogni, 2014). The opportunity to enhance advanced capability and incentive connected to the job designed in human resource management is the infrastructure for staff to plan future personal growth and career development (Blair, Fordyce, & Barney, 1993; Daugherty et al., 2013). In the flourish working environment, to fulfil the personal goal and expectation that follow the ethical code can lead the self-actualization of achievement (Mosadeghrad, 2014; Roche & Sommer, 1995). Based on the core value for healthcare service focus on quality, the staff can participate in the quality improvement program to enhance the service quality and job satisfaction (Roche & Sommer, 1995; Varkey, Karlapudi, & Hensrud, 2008). Stability of team member, positive working

climate and balance of life and work are also important factors to increase employee satisfaction (Amiresmaili & Moosazadeh, 2013).

In the strategic management of BSC framework, the related perspectives with the employee satisfaction consist of the perspective of customer and learning and growth. During the process of implementation and execution of action plan, the team member must cooperate to solve the difficulty faced in the execution phase, there are significant stress and workload from the task performance. The support from supervisor and positive relationship with colleague are important mental resource to coping with the stress. In addition, the strategic management of BSC should create double –loop communication to commit employee to identify the organization vision and get the meaning of job. During the process of execution of action plan, the staff needs to learn more skill to expand their capability to handle difficulty situation. In the same time, they also had the freedom to create specific strategies to foster the improvement, and the incentive from the successful implementation of intervention strategies can motivate them to achieve the performance outcome and personal growth.

In summary, during the process of sustain execution of BSC management, the superintendent create the vision and declare the value and meaning of BSC management for organization change. The incentive related to the performance outcome was design to motivate staff's participation, encourage innovation and actualization of desired outcome.

Empower the delegated task for the team of action plan to enhance the perceived control on the job. The arrangement of joyful leisure activity was provided to relieve the tension in organization management.

These characteristic process of successful BSC management is positively associated with survey items that employee are more satisfied. The employee is more satisfied with supervisor and colleague support and teamwork climate, they had recognize the opportunity of training and had positive experience from job. So the BSC management have positive effectiveness on the employee satisfaction.

5. The effectiveness of BSC management on financial outcome

The financial outcome is the lagging indicators in BSC management framework, it is the product resulted from well-connected of four perspectives and improved performance efficiency under the strategic action plan targeted to the financial goal. In addition, the results will be achieved by the activation of the value-added intangible factors such as innovation, quality of human resource and process improvement of service.

The leader engage with the organization vision to build up infrastructure to face the challenge of changing healthcare environment is the first step to manage the improvement of financial outcome. They initiate to build up the direction and strategic map of organization will be the cornerstone to assure the growth of financial outcome (Demartini & Trucco, 2017; Embree, Swenty, & Schaar, 2015). The healthcare organization assume the patient-centered philosophy to deepen the value-based culture for further development of diversified therapeutic intervention. Then the patient flow and financial revenue will increase (Binder, 2013; Eastaugh, 2014; Fields & Cohen, 2011; Rangnekar, Johnson, Garman, & O'Neil, 2015). During the delivery process of service, continuous quality improvement program to activate the innovation to solve the problems of safety issues, the improved service quality and patient satisfaction under strategic activity can lead the positive financial outcome (Marr & Mullen, 2004; Singh & Wheeler, 2012). The investment of human resource and intangible capital to activate the employee to engage with the participation in service

process will lead better efficiency and financial growth, not the cost containment (Bledsoe, Sullivan, & Mathias, 2012; Kalman, Hammill, Murray, & Schulman, 2014; B. B. Wang, Wan, Falk, & Goodwin, 2001).

In our research, growth rate of financial outcome is higher than the psychiatric hospitals with similar characteristic that didn't use BSC management for financial enhancement. The action plans initiated by the department of sub-specialty was performed every yeas with well-connection of major indicators of four perspectives. These action plans are all designed to promote the increase of financial growth. The action plans of subspecialty are all involved with the process improvement to increase patient flow and financial outcome under strategic map. Most of the goal related to the process improvement and treatment outcome were attained under the enthusiastic participation of interdisciplinary team member to innovate the care management program. In addition, the key indicators of quality were achieved with active coordination of related resource. Except the key factors of value chain in our hypothesis such as the service quality and satisfaction of employee improved, the intangible factors especially the innovation of process, human resource management, intervention of patient satisfaction are activated in the BSC management framework of studied hospital to demonstrated as the positive influencing factors on the financial growth.

During the conductance of BSC (Balanced scorecard) management, the key

components included in the execution of BSC program are as followed: transfer the organization vision into action plan under strategic map, attend to the quality improvement program on the patient-center treatment, focus on the value-enhancement healthcare enterprise and human resource management. In addition, the organization system designed to establish the schedule of regular monitoring of data, analysis of data for development of innovation strategies have become the important acculturation activity. The data provided by informatics system for discussion and knowledge sharing are the basic requirement for execution of action plan, that is proved to be the important factors for the improvement. The effectiveness of BSC management to succeed is resulted from the power control by the sustain maintenance of the structure and double-loop communication to enhance the potential capability of teamwork during execution of action plan.

In sustain strategic management of BSC framework for five years, the involvement of all staff to commit with the organization vision to develop the quality improvement program and financial growth. The superintendent as a leader commit to the mission to transform the organization change with definite policy and motivate the employee to identify the core value of organization. During the process of implementation of BSC management and execution of action plans, the retention rate of employee is high and the burnout rate of employee is low even they are less satisfied with the welfare and promotion opportunity. The staff is most satisfied with the perspectives of leaning, personal growth and the

organization support. The mutual support and respect are the main force to enhance the quality of communication in the coordination of interdisciplinary team to invent the solution strategies toward difficulty situation to attain the goal. The positive job satisfaction of employee can motivate them to engage with the service quality and to enhance patient satisfaction. General speaking, the human resource capital and intangible assets are activated to enhance the growth of financial outcome. Finally, the BSC management has positive effectiveness on the financial outcome resulted from multiple momentum of innovative action plan and intangible asset of organization activated in the process of BSC management.

Chapter seven: Limitation of research

The research is based on retrospective analysis of the data file from the survey performed by different department according to different goal. The datafiles were collected to exam the effectiveness of BSC management on the quality indicators related to patient safety. The datafiles were also used to understand the trend development of patient satisfaction and employee satisfaction, and the change of patient safety culture. It is the strength of this research to exam the effectiveness of BSC management from the natural observation of the sustain execution of BSC management for five years in specific psychiatric hospital.

The limitations are as followed:

First is the content of data files is limited and without original data in some data files, so the data just can be analyzed as trend development, it is the major limitation of our research to understand the influencing factors that impact the difference and the change of the key indicators including patient safety indicators, inpatient satisfaction and employee satisfaction on job.

Second is the analysis just presented as cross section view about the outcomes in different perspectives of BSC framework. It is the limitation to understand the correlation between these outcome measurements due to the datafiles cannot identify the person group toward the question assessed.

Third is that there are multiple bias and confounder factors existed in this research, the selection bias existed in the survey of patient satisfaction, employee satisfaction and survey of patient safety culture. Response bias existed in the patient satisfaction survey, the patient of different function level respond to the question with different view and their interpretation about patient satisfaction questionnaire will be different. The selection bias existed in the survey of employee satisfaction and patient safety culture, the retention rate of employee and the different responder will influence the interpretation of results. The response bias in these survey maybe resulted from different position that influence their thinking and consideration about the question. The employee at different position will be influenced by different authority power, and their pre-thought and attitude toward policy and question surveyed will influence their response, especially in the oriental culture. Reporting bias in patient safety indicators should be considered, different climate of organization and policy in different year, and the monitoring of reporting system will influence the numbers of the reporting events. So the resulted presented should be interpreted carefully owing to the existence of bias.

The fourth is that there are major confounders that influence these outcome measurement. It is difficulty to differentiate the relationship and interaction of the factors in this research. For example, the health policy, healthcare reimbursement will influence the patient satisfaction, patient safety indicators and financial revenue. There are too many

indicators and component with complicate interaction in the framework of BSC structure, it is difficult to define the direction between two outcomes in different perspectives. For example, we cannot differentiate the direction between indicators of patient safety and patient safety culture, that is to say whether the improvement of patient safety influence the patient safety culture or the culture change enhance the patient safety.

The fifth is that the research just study single organization, without control group, the effectiveness is attained by the comparison of pre and post-implementation of BSC management, it is difficulty to examine which key component is specific to influence the outcome and it is difficulty to define their correlation. The results cannot be generalized to other organization due to the different characteristic of organization, leadership pattern, team coordination pattern and different status of intangible asset.

Chapter eight: Conclusion

Conclusion of research results

From the results presented, the key outcome measurement in four perspectives are improved after implementation of BSC structure as strategic management, and most of indicators related to patient safety indicators had positive change after implementation of strategic action plan except some specific indicators such as fall event.

The sustain execution of strategic plan can maintain the patient safety at good level and improve quality of care, but the indicator of patient safety will get backward if cessation of action plan. The BSC management is an effective tool to transform the vision to execution of action plan and performance indicators, it can control the direction of organization and engage the employee to improve systemically.

Most of the dimensions of patient safety culture in studied psychiatric hospital had higher than average score of all public hospital group and all psychiatric hospital group of Ministry of health and welfare. Patient safety culture reveal significant difference in the domains of teamwork cooperation, safety climate, perception of hospital management, working condition in 2014 compared to 2013. The positive organization citizen behaviors such as altruism and organization commitment improved after sustain execution of BSC management. Some score of patient safety culture deteriorated in 2015. The improved part is consistent with the characteristic component of successful BSC management. The

development and concretization of culture is based on collective consensus and organization value that need long-term accumulation of employee commitment and integration of working process to actualization of vision. The sustain conductance of BSC management has positive influence on the establishment of the internal process from the team coordination and creative adaptation with the challenge of environment through the double-loop communication for innovation.

The significant improvement is found in the dimensions of inpatient satisfaction survey, the satisfaction toward hospital environment, professional attitude, service process, personal right, communication and safety, and treatment outcome are all improved after sustain implementation of BSC management. The positive change of patient satisfaction is resulted from all of action plans designed to work on the quality of care and service outcome. The interaction between the patient and therapeutic team had significant impact on the process of improvement toward the patient-centered thinking.

In the process of BSC management, most of employee are satisfied with the part of learning and growth, job condition, work climate and organization commitment. They are less satisfied with promotion opportunity and welfare of organization. The domains of satisfaction are similar with most of the psychiatric hospitals and general public hospital. The satisfaction of employee has mild improvement under sustain execution of BSC management.

The growth rate of financial revenue of studied psychiatric hospital is higher than the psychiatric hospital with similar characteristic in Taiwan. The effectiveness of BSC management on financial growth can be proved in this research from its original design. When all of the employee involve with the achievement of vision and strategic goal, their commitment with the improvement and excellence can lead to the change of organization learning system. The activation of intangible asset will lead to the enhancement of financial growth.

According to the Kaplan and Norton development of BSC structure, the key performance indicators should be connected well to build up cause-effect relationship to achieve the final outcome. In this research, we find that if we focus on the important indicators such as the quality of care issues under the clear value of organization, the activation of positive influence on expected outcome will be attained. That is to say, if we focus on the key factors of internal process, the quality of patient safety, the positive response toward the service from patients will engender the employee's engagement with the change of organization culture. Thereafter, the key component of value chain of healthcare and intangible asset can be activated to attain the global improvement of financial and non-financial outcome.

The global patient safety, patient satisfaction, employee satisfaction, patient safety culture and growth of financial outcome are all reveal positive change after implementation

of BSC framework in hospital management. The results is compatible with our hypothesis about successful management focus on the key factors of value chain will activate the chain reaction in different perspectives to go forward for significant improvement under the well-connection of indicators management.

Chapter Nine: Future Research Plan

In Taiwan healthcare system, the hospital organization has faced significant challenge from the influence of external factors and shortage of inner resource to look forward further development and growth. The external factors consist of increased patients' expectation, social movement for personal right, unclear national policy and the competition of market share. The internal problems include the shortage of professional manpower such as nursing staff and physician of five major medical departments. There are many problems should be solved to attain the goal of health improvement for all population.

In the coming year, Taiwan will enter the aging society, the healthcare burden for the elder population will increase and will give significant impact on the service system to respond the need of this patient group. At present, we still have no invention about adequate reimbursement or payment policy and effective integration of service system to solve the healthcare issue for the elder population. How to enhance the efficiency of healthcare system to face the problems under unstable condition of present healthcare system and shortage of manpower is the major challenge we should manage.

The National Health Insurance system had been established since 1995, had provides comprehensive coverage of all the services for all the people lived in Taiwan. This system had won the reputation from international acclamation about the easy access to medical service and the adequate quality of care. But till now, some distribution problems of medical

resource in remote area still existed, there are no adequate emergent care in some areas. The difficulty to approach the medical resource is the major problems should be managed. In addition, the global budget payment system of National health insurance has limited the comprehensive development of the healthcare organization and has restrict the utilization of effective treatment in some situation that may influence the quality of care.

Till now, the difficulty still existed to establish the hierarchy of medical care and refer system in Taiwan, the medical resource cannot be adequate used. In addition, the shortage of manpower of major medical department such as internist, surgery, pediatrics, obstetrics and gynecology and physician of emergence department due to unfair medical dispute and overloading of labor. The deterioration of working condition has made the condition worse. How to align the medical resource by the fairness of system to satisfy the unmet need of patient and to improve the quality of care should be considered from the global view.

To face the challenge of unstable professional manpower, limited resource in payment system, unclear health policy and imbalance of medical service provision. Several frameworks of hospital management had been adopted to solve the problems and some innovative strategies had been tried to enhance the vitality of organization life. The balanced scorecard management had been recognized as an effective tool to improve the financial and non-financial growth and as the acceptable framework to organize the whole system to commit the change of culture with holistic approach.

The core element of successful conductance of BSC management including the SWOT analysis as diagnosis, value chain activation for benchmarking improvement and quality focus service system to maintain the long-term flow of positive factors to achieve success.

During the process of BSC management, identification of the barrier and sharing of information are the basic requirement for the systemic change of organization. The establishment of cause and effect relationship between key performance indicator in four perspectives based on the strategic map and SWOT analysis is most important for continuous growth. The framework of BSC management can lead to the development of consensus in organization by the double-loop communication. It also can lead to stabilize the human capital resulted from the focus on the ethic principle and value-based thinking for quality improvement.

To implement the strategies to face the challenge based on the SWOT analysis especially toward the parts of internal weakness and external threat, the prospector strategies that focus on the improved quality of product and innovation of process had been proved as positive effectiveness on the growth of organization. The action plan focus on the quality of internal process and social responsibility can lead to the positive outcome of financial growth.

In our research, we find that if we focus on the important indicators such as the quality of care issues under the guidance of organization core value, the activation of

positive influence on the expected outcome will be attained. That is to say, if we focus on the key factors of internal process, especially focus on the indicators of quality of care and patient safety, the positive response toward the service from patients will engender the engagement of employee with the patient-centered service, then the patient satisfaction and the change of organization culture will follow. Thereafter, the key component of value chain of healthcare and intangible asset will be activated to attain the global improvement of financial and non-financial outcome.

During the process of sustain implementation of BSC management program to transform the change of organization, we focus on the quality of care including the indicators related to patient safety and outcome of treatment. All of the staff should be invite to participate in the improvement cycle to tackle the difficulty in the attainment of strategic goal. The interdisciplinary cooperation and mutual communication to invent the effective strategy will be actualize resulted from the leader’s involvement and enthusiastic participation of employee. When the strategic goal of organization had been achieved, the satisfaction of employee from the internal reward of achievement will increase, the power to look forward for the vision of organization will enhance. The attitude of employee will change to the patient-center activity and the positive citizen behavior such as altruism and organization commitment will improved. In the same time, the retention rate of employee increases and burnout rate decreased. The organization culture can be established as the

solid ground for further development and growth.

According to the results of our research, the sustain strategic management of hospital under BSC framework for five years, the superintendent as a leader that commits to the mission to transform the organization change with definite policy and motivate the employee to identify the core value of organization. The service quality, patient satisfaction, employee satisfaction and change of culture have been attained. Finally, the positive effectiveness on the financial outcome resulted from multiple momentum of innovative action plan and activation of intangible asset of organization in the process of BSC management to go forward success.

From the results of our research and the practical experience, the framework of BSC management can be modified into different level of healthcare system to solve the healthcare problems from the macro view of national health policy to micro system including the specific outcome of service practice. To solve the problems of Taiwan healthcare system faces such as the unstable resource of manpower, limited competitive advantage resulted from restricted development from systemic problems and unclear vision of policy. The first step to change is to set the goals focus on the meaningful indication of internal process that is important to the target population or major customer. For example to solve the problems of unstable resource of manpower, we can select the indicators such as completion rate of program to provide service for specific population from the major

department. Then to establish the connected indicators in different perspective based on the framework of structure, process and outcome and BSC framework to initiate for change. The strategic goal can be attained under the staff's learning and continuous improvement cycle to make the program of core indicators more exquisite to satisfy the need of customer and to actualize the value of target. The enthusiasm of staff to participate in the action plan will be activated if proper internal reward of achievement is established resulted from the teamwork cooperation and innovation process. The successful improvement of results and the attainment of the goal can be achieved by the adequate arrangement of well- connected indicators in four perspectives. The most important part of the framework in balanced scorecard management is the regular monitoring and evaluation of strategy to build up the intervention activity to step forward the goal and resolution of difficulty. Then the short-term, medium-term and long-term goal can be established and to be achieved under the sustain conductance of BSC management. The major problems will be solved under the commitment of leader and team member responsible the strategic plan. Thereafter, the activation of the chain reaction will lead to the solution of problems when the satisfaction of major customer improved.

This research just the study of singer organization, without control group. It is difficult to understand which component is specific to influence the outcome and it is difficulty to rule out the other factors not in the perspectives of BSC framework that may influence the

improvement of outcome.

In this retrospective observation study from the analysis of five data files, we just know the trend development, the associated factors or influencing variable on the improvement of these indicators of value chain in healthcare management still need further explored.

In the future, we can design the research to study the effectiveness of BSC management on the organization development. From the macro view, we can design the prospective and comparative study to focus on the effectiveness of BSC management on the major outcome. We can select some hospital with similar characteristic that didn't use BSC framework as management tool as comparative group to study the effectiveness of BSC management on the major outcome in different perspectives under the comparative study.

To study the key components that are the success factors to goal attainment in the BSC framework, we can select some important factors that had been assume that may influence the final outcome based on previous research and hypotheses from the practice of management. The factors such as the organization type, leadership pattern, working climate, teamwork cooperation pattern and employee attitude toward BSC management and the organization culture etc to clarify the key successful factors resulted in the change of outcome.

In addition, we can collect the data systemically from four perspectives and try to exam

the power of influencing factors on the outcome based from the assumption of mutual connection, for example in our research, we can select some domains to form the bundle of indicators to study the associated factors influencing the change of key indicators in the value chain of healthcare management and examine the interaction between factors in different perspectives.

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Reference

Abidin, Z., Davoren, M., Naughton, L., Gibbons, O., Nulty, A., & Kennedy, H. G. (2013). Susceptibility (risk and protective) factors for in-patient violence and self-harm: prospective study of structured professional judgement instruments START and SAPROF, DUNDRUM-3 and DUNDRUM-4 in forensic mental health services. *BMC Psychiatry, 13*, 197. doi:10.1186/1471-244x-13-197

Aboshaiqah, A. E., Alonazi, W. B., & Patalagsa, J. G. (2016). Patients' assessment of quality of care in public tertiary hospitals with and without accreditation: comparative cross-sectional study. *J Adv Nurs, 72*(11), 2750-2761. doi:10.1111/jan.13025

Adibi, H., Khalesi, N., Ravaghi, H., Jafari, M., & Jeddian, A. R. (2012). Development of an effective risk management system in a teaching hospital. *J Diabetes Metab Disord, 11*(1), 15. doi:10.1186/2251-6581-11-15

Agnew, C., Flin, R., & Mearns, K. (2013). Patient safety climate and worker safety behaviours in acute hospitals in Scotland. *J Safety Res, 45*, 95-101. doi:10.1016/j.jsr.2013.01.008

Aiken, L. H., Sermeus, W., Van den Heede, K., Sloane, D. M., Busse, R., McKee, M., . . . Kutney-Lee, A. (2012). Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *Bmj, 344*, e1717. doi:10.1136/bmj.e1717

Allen, D., Braithwaite, J., Sandall, J., & Waring, J. (2016). Towards a sociology of healthcare

safety and quality. *Sociol Health Illn, 38*(2), 181-197. doi:10.1111/1467-9566.12390

Alolah, T., Stewart, R. A., Panuwatwanich, K., & Mohamed, S. (2014). Determining the causal relationships among balanced scorecard perspectives on school safety performance: case of Saudi Arabia. *Accid Anal Prev, 68*, 57-74. doi:10.1016/j.aap.2014.02.002

Amiresmaili, M., & Moosazadeh, M. (2013). Determining job satisfaction of nurses working in hospitals of Iran: A systematic review and meta-analysis. *Iran J Nurs Midwifery Res, 18*(5), 343-348.

Andaleeb, S. S., & Kara, A. (2013). The structure of service quality perceptions for multiple-encounter services. *Qual Manag Health Care, 22*(4), 306-321. doi:10.1097/qmh.0000000000000001

Anderson, G. F., Alonso, J., Kohn, L. T., & Black, C. (1994). Analyzing health outcomes through international comparisons. *Med Care, 32*(5), 526-534.

Anton, C. (2009). The impact of role stress on workers' behaviour through job satisfaction and organizational commitment. *Int J Psychol, 44*(3), 187-194. doi:10.1080/00207590701700511

Archer, J. C., & McAvoy, P. (2011). Factors that might undermine the validity of patient and multi-source feedback. *Med Educ, 45*(9), 886-893. doi:10.1111/j.1365-2923.2011.04023.x

Aubin, M., Giguere, A., Martin, M., Verreault, R., Fitch, M. I., Kazanjian, A., & Carmichael, P. H.

(2012). Interventions to improve continuity of care in the follow-up of patients with cancer. *Cochrane Database Syst Rev*(7), Cd007672. doi:10.1002/14651858.CD007672.pub2

Baeza, I., Correll, C. U., Saito, E., Amanbekova, D., Ramani, M., Kapoor, S., . . . Carbon, M. (2013). Frequency, characteristics and management of adolescent inpatient aggression. *J Child Adolesc Psychopharmacol, 23*(4), 271-281. doi:10.1089/cap.2012.0116

Baker, T. L., & Taylor, S. A. (1997). Patient satisfaction and service quality in the formation of customers' future purchase intentions in competitive health service settings. *Health Mark Q, 15*(1), 1-15.

Battistelli, A., Galletta, M., Portoghese, I., & Vandenberghe, C. (2013). Mindsets of commitment and motivation: interrelationships and contribution to work outcomes. *J Psychol, 147*(1), 17-48. doi:10.1080/00223980.2012.668146

Bauer, T. N., Bodner, T., Erdogan, B., Truxillo, D. M., & Tucker, J. S. (2007). Newcomer adjustment during organizational socialization: a meta-analytic review of antecedents, outcomes, and methods. *J Appl Psychol, 92*(3), 707-721. doi:10.1037/0021-9010.92.3.707

Beghi, M., Peroni, F., Gabola, P., Rossetti, A., & Cornaggia, C. M. (2013). Prevalence and risk factors for the use of restraint in psychiatry: a systematic review. *Riv Psichiatr, 48*(1),

10-22. doi:10.1708/1228.13611

Behrouzi, F., Shaharoun, A. M., & Ma'aram, A. (2014). Applications of the balanced scorecard for strategic management and performance measurement in the health sector. *Aust Health Rev, 38*(2), 208-217. doi:10.1071/ah13170

Bierman, A. S., Lawrence, W. F., Haffer, S. C., & Clancy, C. M. (2001). Functional health outcomes as a measure of health care quality for Medicare beneficiaries. *Health Serv Res, 36*(6 Pt 2), 90-109.

Bilanakis, N., Kalampokis, G., Christou, K., & Peritogiannis, V. (2010). Use of coercive physical measures in a psychiatric ward of a general hospital in Greece. *Int J Soc Psychiatry, 56*(4), 402-411. doi:10.1177/0020764009106620

Bilkhu-Thompson, M. K. (2003). A process evaluation of a health care Balanced Scorecard. *J Health Care Finance, 30*(2), 37-64.

Binder, L. (2013). Focus on value. Hospitals, patients benefit when providers treat quality like a financial report. *Mod Healthc, 43*(17), 26.

Bisbe, J., & Barrubes, J. (2012). The Balanced Scorecard as a management tool for assessing and monitoring strategy implementation in health care organizations. *Rev Esp Cardiol (Engl Ed), 65*(10), 919-927. doi:10.1016/j.recesp.2012.05.014

Bishop, A., & Fleming, M. (2014). Patient safety and engagement at the frontlines of healthcare. *Healthc Q, 17 Spec No*, 36-40.

Bjertnaes, O. A., Sjetne, I. S., & Iversen, H. H. (2012). Overall patient satisfaction with hospitals: effects of patient-reported experiences and fulfilment of expectations. *BMJ Qual Saf, 21*(1), 39-46. doi:10.1136/bmjqs-2011-000137

Blair, C. S., Fordyce, M., & Barney, S. M. (1993). Quality management of human resources. Providers should begin by focusing on education, performance management, and reward systems. *Health Prog, 74*(8), 16-21.

Bledsoe, D. N., Sullivan, D., & Mathias, D. (2012). Human capital and process improvement. *Nurs Manage, 43*(1), 46-53. doi:10.1097/01.numa.0000394054.92218.04

Bohus, M., Schmahl, C., Herpertz, S. C., Lieb, K., Berger, M., Roepke, S., . . . Lyssenko, L. (2016). [Guideline-adherent inpatient psychiatric psychotherapeutic treatment of borderline personality disorder : Normative definition of personnel requirements]. *Nervenarzt, 87*(7), 739-745. doi:10.1007/s00115-016-0132-y

Bosko, T., & Wilson, K. (2016). Assessing the relationship between patient satisfaction and clinical quality in an ambulatory setting. *J Health Organ Manag, 30*(7), 1063-1080. doi:10.1108/jhom-11-2015-0181

Bouland, D. L., Fink, E., & Fontanesi, J. (2011). Introduction of the Balanced Scorecard into an academic department of medicine: creating a road map to success. *J Med Pract Manage, 26*(6), 331-335.

Bowers, L., Alexander, J., & Gaskell, C. (2003). A trial of an anti-absconding intervention in

acute psychiatric wards. *J Psychiatr Ment Health Nurs, 10*(4), 410-416.

Bowers, L., Simpson, A., & Alexander, J. (2005). Real world application of an intervention to reduce absconding. *J Psychiatr Ment Health Nurs, 12*(5), 598-602. doi:10.1111/j.1365-2850.2005.00879.x

Braddock, C. H., 3rd, Szaflarski, N., Forsey, L., Abel, L., Hernandez-Boussard, T., & Morton, J. (2015). The TRANSFORM Patient Safety Project: a microsystem approach to improving outcomes on inpatient units. *J Gen Intern Med, 30*(4), 425-433. doi:10.1007/s11606-014-3067-7

Bredart, A., Razavi, D., Robertson, C., Brignone, S., Fonzo, D., Petit, J. Y., & de Haes, J. C. (2002). Timing of patient satisfaction assessment: effect on questionnaire acceptability, completeness of data, reliability and variability of scores. *Patient Educ Couns, 46*(2), 131-136.

Brook, M., Hilty, D. M., Liu, W., Hu, R., & Frye, M. A. (2006). Discharge against medical advice from inpatient psychiatric treatment: a literature review. *Psychiatr Serv, 57*(8), 1192-1198. doi:10.1176/ps.2006.57.8.1192

Brumbles, D., & Meister, A. (2013). Psychiatric elopement: using evidence to examine causative factors and preventative measures. *Arch Psychiatr Nurs, 27*(1), 3-9. doi:10.1016/j.apnu.2012.07.002

Brush, R. W., & Kaelbling, R. (1963). Discharge of psychiatric patients against medical advice.

J Nerv Ment Dis, 136, 288-292.

Cameron, I. D., Gillespie, L. D., Robertson, M. C., Murray, G. R., Hill, K. D., Cumming, R. G., & Kerse, N. (2012). Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database Syst Rev, 12*, Cd005465. doi:10.1002/14651858.CD005465.pub3

Campbell, S. M., Roland, M. O., & Buetow, S. A. (2000). Defining quality of care. *Soc Sci Med, 51*(11), 1611-1625.

Chambers, D. W. (2002). Measured success. *J Am Coll Dent, 69*(3), 61-67.

Chang, C. S., Chen, S. Y., & Lan, Y. T. (2013). Service quality, trust, and patient satisfaction in interpersonal-based medical service encounters. *BMC Health Serv Res, 13*, 22. doi:10.1186/1472-6963-13-22

Charbon, J., & Oyon, D. (2001). [The Balanced Scorecard: quality management in aide associations/foundations and home care services]. *Rev Med Suisse Romande, 121*(11), 811-817.

Chatalalsingh, C., & Reeves, S. (2014). Leading team learning: what makes interprofessional teams learn to work well? *J Interprof Care, 28*(6), 513-518. doi:10.3109/13561820.2014.900001

Chen, H., Yu, P., Hailey, D., & Wang, N. (2014). Methods for assessing the quality of data in public health information systems: a critical review. *Stud Health Technol Inform, 204*,

13-18.

Chen, H. F., Hou, Y. H., & Chang, R. E. (2012). Application of the balanced scorecard to an academic medical center in Taiwan: the effect of warning systems on improvement of hospital performance. *J Chin Med Assoc, 75*(10), 530-535. doi:10.1016/j.jcma.2012.07.007

Chen, I. C., & Li, H. H. (2010). Measuring patient safety culture in Taiwan using the Hospital Survey on Patient Safety Culture (HSOPSC). *BMC Health Serv Res, 10*, 152. doi:10.1186/1472-6963-10-152

Chen, Y., McCabe, B., & Hyatt, D. (2017). Impact of individual resilience and safety climate on safety performance and psychological stress of construction workers: A case study of the Ontario construction industry. *J Safety Res, 61*, 167-176. doi:10.1016/j.jsr.2017.02.014

Chiok Foong Loke, J. (2001). Leadership behaviours: effects on job satisfaction, productivity and organizational commitment. *J Nurs Manag, 9*(4), 191-204.

Chiu, W. T., Yang, C. M., Lin, H. W., & Chu, T. B. (2007). Development and implementation of a nationwide health care quality indicator system in Taiwan. *Int J Qual Health Care, 19*(1), 21-28. doi:10.1093/intqhc/mzl063

Chow, C. W., Ganulin, D., Teknika, O., Haddad, K., & Williamson, J. (1998). The balanced scorecard: a potent tool for energizing and focusing healthcare organization

management. *J Healthc Manag, 43*(3), 263-280.

Chu, H. L., Wang, C. C., & Dai, Y. T. (2009). A study of a nursing department performance measurement system: using the Balanced Scorecard and the Analytic Hierarchy Process. *Nurs Econ, 27*(6), 401-407.

Cicolini, G., Comparcini, D., & Simonetti, V. (2014). Workplace empowerment and nurses' job satisfaction: a systematic literature review. *J Nurs Manag, 22*(7), 855-871. doi:10.1111/jonm.12028

Citrome, L., & Yeomans, D. (2005). Do guidelines for severe mental illness promote physical health and well-being? *J Psychopharmacol, 19*(6 Suppl), 102-109. doi:10.1177/0269881105059505

Clark, P. A., Wolosin, R. J., & Gavran, G. (2006). Customer convergence: patients, physicians, and employees share in the experience and evaluation of healthcare quality. *Health Mark Q, 23*(3), 79-99.

Clay-Williams, R., Nosrati, H., Cunningham, F. C., Hillman, K., & Braithwaite, J. (2014). Do large-scale hospital- and system-wide interventions improve patient outcomes: a systematic review. *BMC Health Serv Res, 14*, 369. doi:10.1186/1472-6963-14-369

Coia, D., & Glassborow, R. (2009). Mental health quality and outcome measurement and improvement in Scotland. *Curr Opin Psychiatry, 22*(6), 643-647. doi:10.1097/YCO.0b013e3283319ac2

Curtright, J. W., Stolp-Smith, S. C., & Edell, E. S. (2000). Strategic performance management: development of a performance measurement system at the Mayo Clinic. *J Healthc Manag, 45*(1), 58-68.

Dack, C., Ross, J., Papadopoulos, C., Stewart, D., & Bowers, L. (2013). A review and meta-analysis of the patient factors associated with psychiatric in-patient aggression. *Acta Psychiatr Scand, 127*(4), 255-268. doi:10.1111/acps.12053

Daffern, M., Thomas, S., Ferguson, M., Podubinski, T., Hollander, Y., Kulkhani, J., . . . Foley, F. (2010). The impact of psychiatric symptoms, interpersonal style, and coercion on aggression and self-harm during psychiatric hospitalization. *Psychiatry, 73*(4), 365-381. doi:10.1521/psyc.2010.73.4.365

Dalrymple, A. J., & Fata, M. (1993). Cross-validating factors associated with discharges against medical advice. *Can J Psychiatry, 38*(4), 285-289.

Daugherty, J. D., Blake, S. C., Kohler, S. S., Culler, S. D., Hawley, J. N., & Rask, K. J. (2013). Quality improvement training: experiences of frontline staff. *Int J Health Care Qual Assur, 26*(7), 627-641. doi:10.1108/ijhcqa-10-2011-0056

Davies, A., Kleeberg, U. R., Jarosz, J., Mercadante, S., Poulain, P., O'Brien, T., . . . Kress, H. G. (2015). Improved patient functioning after treatment of breakthrough cancer pain: an open-label study of fentanyl buccal tablet in patients with cancer pain. *Support Care Cancer, 23*(7), 2135-2143. doi:10.1007/s00520-014-2590-8

Davis, D. A., & Taylor-Vaisey, A. (1997). Translating guidelines into practice. A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *Cmaj, 157*(4), 408-416.

Davison, S., Hauck, Y., Martyr, P., & Rock, D. (2013). How mental health clinicians want to evaluate the care they give: a Western Australian study. *Aust Health Rev, 37*(3), 375-380. doi:10.1071/ah12171

De Gieter, S., Hofmans, J., & Pepermans, R. (2011). Revisiting the impact of job satisfaction and organizational commitment on nurse turnover intention: an individual differences analysis. *Int J Nurs Stud, 48*(12), 1562-1569. doi:10.1016/j.ijnurstu.2011.06.007

de la Cour, J. (1992). Assessment of staff appraisal systems. *Br J Nurs, 1*(2), 99-102.

Dean Beaulieu, N., & Epstein, A. M. (2002). National Committee on Quality Assurance health-plan accreditation: predictors, correlates of performance, and market impact. *Med Care, 40*(4), 325-337.

Delnoij, D. M., & Westert, G. P. (2012). Assessing the validity of quality indicators: keep the context in mind! *Eur J Public Health, 22*(4), 452-453. doi:10.1093/eurpub/cks086

Demartini, C., & Trucco, S. (2017). Are performance measurement systems useful? Perceptions from health care. *BMC Health Serv Res, 17*(1), 96. doi:10.1186/s12913-017-2022-9

Desmarais, S. L., Nicholls, T. L., Wilson, C. M., & Brink, J. (2012). Using dynamic risk and protective factors to predict inpatient aggression: reliability and validity of START assessments. *Psychol Assess, 24*(3), 685-700. doi:10.1037/a0026668

Di Tecco, C., & Borgogni, L. (2014). Self efficacy, perceptions of social context, job satisfaction and their relationship with absence from work. An integrated model founded on social cognitive theory. *Med Lav, 105*(4), 282-295.

DiCuccio, M. H. (2015). The Relationship Between Patient Safety Culture and Patient Outcomes: A Systematic Review. *J Patient Saf, 11*(3), 135-142. doi:10.1097/pts.0000000000000058

Dixon-Woods, M., McNicol, S., & Martin, G. (2012). Ten challenges in improving quality in healthcare: lessons from the Health Foundation's programme evaluations and relevant literature. *BMJ Qual Saf, 21*(10), 876-884. doi:10.1136/bmjqs-2011-000760

Donabedian, A. (1988). The quality of care. How can it be assessed? *Jama, 260*(12), 1743-1748.

Donabedian, A. (2005). Evaluating the quality of medical care. 1966. *Milbank Q, 83*(4), 691-729. doi:10.1111/j.1468-0009.2005.00397.x

Donat, D. C. (2003). An analysis of successful efforts to reduce the use of seclusion and restraint at a public psychiatric hospital. *Psychiatr Serv, 54*(8), 1119-1123. doi:10.1176/appi.ps.54.8.1119

Dong, Y., Liao, H., Chuang, A., Zhou, J., & Campbell, E. M. (2015). Fostering employee service creativity: Joint effects of customer empowering behaviors and supervisory empowering leadership. *J Appl Psychol, 100*(5), 1364-1380. doi:10.1037/a0038969

Duffy, D. (1990). Discharged against medical advice: causes and consequences. *Can Fam Physician, 36*, 1495-1498.

Duxbury, J. (2002). An evaluation of staff and patient views of and strategies employed to manage inpatient aggression and violence on one mental health unit: a pluralistic design. *J Psychiatr Ment Health Nurs, 9*(3), 325-337.

Dwamena, F., Holmes-Rovner, M., Gaulden, C. M., Jorgenson, S., Sadigh, G., Sikorskii, A., . . . Olomu, A. (2012). Interventions for providers to promote a patient-centred approach in clinical consultations. *Cochrane Database Syst Rev, 12*, Cd003267. doi:10.1002/14651858.CD003267.pub2

Eastaugh, S. R. (2014). Hospital diversification strategy. *J Health Care Finance, 40*(3), 1-13.

Eddy, D. M., Pawlson, L. G., Schaaf, D., Peskin, B., Shcheprov, A., Dziuba, J., . . . Eng, B. (2008). The potential effects of HEDIS performance measures on the quality of care. *Health Aff (Millwood), 27*(5), 1429-1441. doi:10.1377/hlthaff.27.5.1429

Edward, A., Kumar, B., Kakar, F., Salehi, A. S., Burnham, G., & Peters, D. H. (2011). Configuring balanced scorecards for measuring health system performance: evidence from 5 years' evaluation in Afghanistan. *PLoS Med, 8*(7), e1001066.

doi:10.1371/journal.pmed.1001066

El-Badri, S., & Mellsop, G. (2008). Patient and staff perspectives on the use of seclusion. *Australas Psychiatry, 16*(4), 248-252. doi:10.1080/10398560802027302

Embree, J. L., Swenty, C. F., & Schaar, G. (2015). A Balanced Scorecard With Strategy Map: Measuring the Value of a Nursing Sabbatical. *J Nurs Care Qual, 30*(4), 352-358. doi:10.1097/ncq.0000000000000121

Essock, S. M., Olfson, M., & Hogan, M. F. (2015). Current practices for measuring mental health outcomes in the USA: International overview of routine outcome measures in mental health. *Int Rev Psychiatry, 27*(4), 296-305. doi:10.3109/09540261.2015.1014314

Evans, D., Hodgkinson, B., Lambert, L., & Wood, J. (2001). Falls risk factors in the hospital setting: a systematic review. *Int J Nurs Pract, 7*(1), 38-45.

Ewen, R. B., Smith, P. C., Hulin, C. L., & Locke, E. A. (1966). An empirical test of the Herzberg two-factor theory. *J Appl Psychol, 50*(6), 544-550.

Farup, P. G. (2015). Are measurements of patient safety culture and adverse events valid and reliable? Results from a cross sectional study. *BMC Health Serv Res, 15*, 186. doi:10.1186/s12913-015-0852-x

Feng, X., Bobay, K., & Weiss, M. (2008). Patient safety culture in nursing: a dimensional concept analysis. *J Adv Nurs, 63*(3), 310-319. doi:10.1111/j.1365-2648.2008.04728.x

Fervaha, G., Agid, O., Takeuchi, H., Foussias, G., & Remington, G. (2014). Effect of antipsychotic medication on overall life satisfaction among individuals with chronic schizophrenia: findings from the NIMH CATIE study. *Eur Neuropsychopharmacol, 24*(7), 1078-1085. doi:10.1016/j.euroneuro.2014.03.001

Fields, S. A., & Cohen, D. (2011). Performance enhancement using a balanced scorecard in a Patient-centered Medical Home. *Fam Med, 43*(10), 735-739.

Fisher, C. E., Spaeth-Rublee, B., & Alan Pincus, H. (2013). Developing mental health-care quality indicators: toward a common framework. *Int J Qual Health Care, 25*(1), 75-80. doi:10.1093/intqhc/mzs074

Fishman, L., Mehrmann, L., Lietz, M., Lessing, C., & Thomeczek, C. (2014). [Current status of the "European Union Network for Patient Safety and Quality of Care (PaSQ)" Joint Action]. *Z Evid Fortbild Qual Gesundhwes, 108*(1), 51-52. doi:10.1016/j.zefq.2014.01.001

Ford, E. W., Silvera, G. A., Kazley, A. S., Diana, M. L., & Huerta, T. R. (2016). Assessing the relationship between patient safety culture and EHR strategy. *Int J Health Care Qual Assur, 29*(6), 614-627. doi:10.1108/ijhcqa-10-2015-0125

Forgione, D. A. (1997). Health care financial and quality measures: international call for a "balanced scorecard" approach. *J Health Care Finance, 24*(1), 55-58.

Gaebel, W., Grossimlinghaus, I., Heun, R., Janssen, B., Johnson, B., Kurimay, T., . . . Zielasek, J.

(2015). European Psychiatric Association (EPA) guidance on quality assurance in mental healthcare. *Eur Psychiatry, 30*(3), 360-387. doi:10.1016/j.eurpsy.2015.01.011

Gagnon, M. P., Desmartis, M., Dipankui, M. T., Gagnon, J., & St-Pierre, M. (2013). Alternatives to seclusion and restraint in psychiatry and in long-term care facilities for the elderly: perspectives of service users and family members. *Patient, 6*(4), 269-280. doi:10.1007/s40271-013-0023-2

Gao, T., & Gurd, B. (2015). Meeting the challenge in performance management: the diffusion and implementation of the balanced scorecard in Chinese hospitals. *Health Policy Plan, 30*(2), 234-241. doi:10.1093/heapol/czu008

Gater, R., Chew, Z., & Saeed, K. (2015). Situational analysis: preliminary regional review of the Mental Health Atlas 2014. *East Mediterr Health J, 21*(7), 467-476.

Georgieva, I., Mulder, C. L., & Whittington, R. (2012). Evaluation of behavioral changes and subjective distress after exposure to coercive inpatient interventions. *BMC Psychiatry, 12*, 54. doi:10.1186/1471-244x-12-54

Gerteis, M. (1999). Conference overview: through the patient's eyes--improvement strategies that work. *Jt Comm J Qual Improv, 25*(7), 335-342.

Ginsburg, L. R., Chuang, Y. T., Norton, P. G., Berta, W., Tregunno, D., Ng, P., & Richardson, J. (2009). Development of a measure of patient safety event learning responses. *Health Serv Res, 44*(6), 2123-2147. doi:10.1111/j.1475-6773.2009.01021.x

Ginsburg, L. R., Chuang, Y. T., Richardson, J., Norton, P. G., Berta, W., Tregunno, D., & Ng, P. (2009). Categorizing errors and adverse events for learning: a provider perspective. *Healthc Q, 12 Spec No Patient*, 154-160.

Goree, M. (2002). Thinking strategically. *Mich Health Hosp, 38*(5), 8-11.

Gosfield, A. G. (2014). Using patient safety organizations to further clinical integration. *J Med Pract Manage, 29*(5), 278-281.

Gowdy, M., & Godfrey, S. (2003). Using tools to assess and prevent inpatient falls. *Jt Comm J Qual Saf, 29*(7), 363-368.

Graen, G. B. (1966). Addendum to "an empirical test of the Herzberg two-factor theory". *J Appl Psychol, 50*(6), 551-555.

Graham, C. (2016). Incidence and impact of proxy response in measuring patient experience: secondary analysis of a large postal survey using propensity score matching. *Int J Qual Health Care, 28*(2), 246-252. doi:10.1093/intqhc/mzw009

Graugaard, P. K., Holgersen, K., Eide, H., & Finset, A. (2005). Changes in physician-patient communication from initial to return visits: a prospective study in a haematology outpatient clinic. *Patient Educ Couns, 57*(1), 22-29. doi:10.1016/j.pec.2004.03.014

Griffith, J. R., Alexander, J. A., & Jelinek, R. C. (2002). Measuring comparative hospital performance. *J Healthc Manag, 47*(1), 41-57.

Groene, O., Arah, O. A., Klazinga, N. S., Wagner, C., Bartels, P. D., Kristensen, S., . . . Sunol, R.

(2015). Patient Experience Shows Little Relationship with Hospital Quality Management Strategies. *PLoS One, 10*(7), e0131805. doi:10.1371/journal.pone.0131805

Groene, O., Brandt, E., Schmidt, W., & Moeller, J. (2009). The Balanced Scorecard of acute settings: development process, definition of 20 strategic objectives and implementation. *Int J Qual Health Care, 21*(4), 259-271. doi:10.1093/intqhc/mzp024

Gudjonsson, G. H., Rabe-Hesketh, S., & Szmukler, G. (2004). Management of psychiatric in-patient violence: patient ethnicity and use of medication, restraint and seclusion. *Br J Psychiatry, 184*, 258-262.

Guldenmund, F. W. (2010). (Mis)understanding Safety Culture and Its Relationship to Safety Management. *Risk Anal, 30*(10), 1466-1480. doi:10.1111/j.1539-6924.2010.01452.x

Gumbus, A., & Lussier, R. N. (2003). Developing and using a balanced scorecard: a case study with SWOT analysis. *Clin Leadersh Manag Rev, 17*(2), 69-74.

Gunnell, D., Metcalfe, C., While, D., Hawton, K., Ho, D., Appleby, L., & Kapur, N. (2012). Impact of national policy initiatives on fatal and non-fatal self-harm after psychiatric hospital discharge: time series analysis. *Br J Psychiatry, 201*(3), 233-238. doi:10.1192/bjp.bp.111.104422

Hall, F. (1998). Employee satisfaction as it relates to customer service. *Top Health Inf Manage, 18*(3), 25-31.

Haralambous, B., Haines, T. P., Hill, K., Moore, K., Nitz, J., & Robinson, A. (2010). A protocol for an individualised, facilitated and sustainable approach to implementing current evidence in preventing falls in residential aged care facilities. *BMC Geriatr, 10*, 8. doi:10.1186/1471-2318-10-8

Harolds, J. A. (2015). Quality and safety in health care, part V: introduction to crossing the quality chasm. *Clin Nucl Med, 40*(12), 959-961. doi:10.1097/rlu.0000000000000969

Harris, C. D., & Bratzler, D. W. (2013). Evaluating quality of care: the role of peer review. *J Okla State Med Assoc, 106*(7), 279, 281-274.

Hekkert, K. D., Cihangir, S., Kleefstra, S. M., van den Berg, B., & Kool, R. B. (2009). Patient satisfaction revisited: a multilevel approach. *Soc Sci Med, 69*(1), 68-75. doi:10.1016/j.socscimed.2009.04.016

Herbstman, B. J., & Pincus, H. A. (2009). Measuring mental healthcare quality in the United States: a review of initiatives. *Curr Opin Psychiatry, 22*(6), 623-630. doi:10.1097/YCO.0b013e3283318ece

Hermann, R. C., Leff, H. S., Palmer, R. H., Yang, D., Teller, T., Provost, S., . . . Chan, J. (2000). Quality measures for mental health care: results from a national inventory. *Med Care Res Rev, 57 Suppl 2*, 136-154. doi:10.1177/1077558700057002s08

Hermann, R. C., & Palmer, R. H. (2002). Common ground: a framework for selecting core quality measures for mental health and substance abuse care. *Psychiatr Serv, 53*(3),

281-287. doi:10.1176/appi.ps.53.3.281

Hetrick, S. E., Simmons, M., Thompson, A., & Parker, A. G. (2011). What are specialist mental health clinician attitudes to guideline recommendations for the treatment of depression in young people? *Aust N Z J Psychiatry, 45*(11), 993-1001. doi:10.3109/00048674.2011.619161

Higginbotham, E. J., & Church, K. C. (2012). Strategic planning as a tool for achieving alignment in academic health centers. *Trans Am Clin Climatol Assoc, 123*, 292-303.

Hill, M. R., Roberts, M. J., Alderson, M. L., & Gale, T. C. (2015). Safety culture and the 5 steps to safer surgery: an intervention study. *Br J Anaesth, 114*(6), 958-962. doi:10.1093/bja/aev063

Hoffmann, B., Muller, V., Rochon, J., Gondan, M., Muller, B., Albay, Z., . . . Gerlach, F. M. (2014). Effects of a team-based assessment and intervention on patient safety culture in general practice: an open randomised controlled trial. *BMJ Qual Saf, 23*(1), 35-46. doi:10.1136/bmjqs-2013-001899

Holzer, B. M., & Minder, C. E. (2011). A simple approach to fairer hospital benchmarking using patient experience data. *Int J Qual Health Care, 23*(5), 524-530. doi:10.1093/intqhc/mzr047

Horowitz, D., Guyer, M., & Sanders, K. (2015). Psychosocial approaches to violence and aggression: contextually anchored and trauma-informed interventions. *CNS Spectr,*

20(3), 190-199. doi:10.1017/s1092852915000280

Howe, A. (2006). Can the patient be on our team? An operational approach to patient involvement in interprofessional approaches to safe care. *J Interprof Care, 20*(5), 527-534. doi:10.1080/13561820600936244

Howell, A. M., Burns, E. M., Bouras, G., Donaldson, L. J., Athanasiou, T., & Darzi, A. (2015). Can Patient Safety Incident Reports Be Used to Compare Hospital Safety? Results from a Quantitative Analysis of the English National Reporting and Learning System Data. *PLoS One, 10*(12), e0144107. doi:10.1371/journal.pone.0144107

Hsu, Y. C., Jerng, J. S., Chang, C. W., Chen, L. C., Hsieh, M. Y., Huang, S. F., . . . Hung, K. Y. (2014). Integrating team resource management program into staff training improves staff's perception and patient safety in organ procurement and transplantation: the experience in a university-affiliated medical center in Taiwan. *BMC Surg, 14*, 51. doi:10.1186/1471-2482-14-51

Huang, C. C., You, C. S., & Tsai, M. T. (2012). A multidimensional analysis of ethical climate, job satisfaction, organizational commitment, and organizational citizenship behaviors. *Nurs Ethics, 19*(4), 513-529. doi:10.1177/0969733011433923

Huang, S. H., Chen, P. L., Yang, M. C., Chang, W. Y., & Lee, H. J. (2004). Using a balanced scorecard to improve the performance of an emergency department. *Nurs Econ, 22*(3), 140-146, 107.

Ikkos, G., Sugarman, P., & Bouras, N. (2015). Mental health services commissioning and provision: Lessons from the UK? *Psychiatriki, 26*(3), 181-187.

Impagliazzo, C., Ippolito, A., & Zoccoli, P. (2009). The balanced scorecard as a strategic management tool: its application in the regional public health system in Campania. *Health Care Manag (Frederick), 28*(1), 44-54. doi:10.1097/HCM.0b013e318196df0f

Inamdar, N., Kaplan, R. S., & Bower, M. (2002). Applying the balanced scorecard in healthcare provider organizations. *J Healthc Manag, 47*(3), 179-195; discussion 195-176.

Inamdar, S. N., Kaplan, R. S., Jones, M. L., & Menitoff, R. (2000). The Balanced Scorecard: a strategic management system for multi-sector collaboration and strategy implementation. *Qual Manag Health Care, 8*(4), 21-39.

Jackson, T., & Wood, B. D. (2010). Employee and customer satisfaction in healthcare. *Radiol Manage, 32*(2), 20-25; quiz 26-27.

Jenkinson, C., Coulter, A., Bruster, S., Richards, N., & Chandola, T. (2002). Patients' experiences and satisfaction with health care: results of a questionnaire study of specific aspects of care. *Qual Saf Health Care, 11*(4), 335-339.

Jones, K. J., Skinner, A., Xu, L., Sun, J., & Mueller, K. (2008). Advances in Patient Safety The AHRQ Hospital Survey on Patient Safety Culture: A Tool to Plan and Evaluate Patient Safety Programs. In K. Henriksen, J. B. Battles, M. A. Keyes, & M. L. Grady (Eds.),

Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 2: Culture and Redesign). Rockville (MD): Agency for Healthcare Research and Quality (US).

Jones, M. L., Filip, S. J., Smith, H., & Remsburg-Bell, E. (2002). Strategy management system in perinatal services: the role of a patient resource manager. *Lippincotts Case Manag, 7*(1), 27-42.

Jones, S., Coggon, D., Ntani, G., & Williams, S. (2015). Will NICE guidance for employers improve workers' mental health? *Occup Med (Lond), 65*(6), 437-439. doi:10.1093/occmed/kqv083

Kalman, N. S., Hammill, B. G., Murray, R. B., & Schulman, K. A. (2014). Removing a constraint on hospital utilization: a natural experiment in Maryland. *Am J Manag Care, 20*(6), e191-199.

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard--measures that drive performance. *Harv Bus Rev, 70*(1), 71-79.

Kaplan, R. S., & Norton, D. P. (2000). Having trouble with your strategy? Then map it. *Harv Bus Rev, 78*(5), 167-176, 202.

Kaplan, R. S., & Norton, D. P. (2006). How to implement a new strategy without disrupting your organization. *Harv Bus Rev, 84*(3), 100-109, 150.

Kaplan, R. S., & Norton, D. P. (2008). Mastering the management system. *Harv Bus Rev, 86*(1),

62-77, 136.

Karman, P., Kool, N., Poslawsky, I. E., & van Meijel, B. (2015). Nurses' attitudes towards self-harm: a literature review. *J Psychiatr Ment Health Nurs, 22*(1), 65-75. doi:10.1111/jpm.12171

Katz-Navon, T., Naveh, E., & Stern, Z. (2007). Safety self-efficacy and safety performance: potential antecedents and the moderation effect of standardization. *Int J Health Care Qual Assur, 20*(7), 572-584. doi:10.1108/09526860710822716

Kazandjian, V. A., Lawthers, J., Cernak, C. M., & Pipesh, F. C. (1993). Relating outcomes to processes of care: the Maryland Hospital Association's Quality Indicator Project (QI Project). *Jt Comm J Qual Improv, 19*(11), 530-538.

Kazandjian, V. A., Wood, P., & Lawthers, J. (1995). Balancing science and practice in indicator development: the Maryland Hospital Association Quality Indicator (QI) project. *Int J Qual Health Care, 7*(1), 39-46.

Kendall, T., Glover, N., Taylor, C., & Pilling, S. (2011). Quality, bias and service user experience in healthcare: 10 years of mental health guidelines at the UK National Collaborating Centre for Mental Health. *Int Rev Psychiatry, 23*(4), 342-351. doi:10.3109/09540261.2011.607432

Kersnik, J. (2001). Determinants of customer satisfaction with the health care system, with the possibility to choose a personal physician and with a family doctor in a transition

country. *Health Policy, 57*(2), 155-164.

Khan, M. M., Hotchkiss, D. R., Dmytraczenko, T., & Zunaid Ahsan, K. (2013). Use of a Balanced Scorecard in strengthening health systems in developing countries: an analysis based on nationally representative Bangladesh Health Facility Survey. *Int J Health Plann Manage, 28*(2), 202-215. doi:10.1002/hpm.2136

Kissling, W., Seemann, U., & Piwernetz, K. (2001). Quality management in psychiatry. *Int Clin Psychopharmacol, 16 Suppl 3*, S15-24.

Knutzen, M., Mjosund, N. H., Eidhammer, G., Lorentzen, S., Opjordsmoen, S., Sandvik, L., & Friis, S. (2011). Characteristics of psychiatric inpatients who experienced restraint and those who did not: a case-control study. *Psychiatr Serv, 62*(5), 492-497. doi:10.1176/ps.62.5.pss6205_0492

Kocakulah, M. C., & Austill, A. D. (2007). Balanced scorecard application in the health care industry: a case study. *J Health Care Finance, 34*(1), 72-99.

Kohn, L. T. (2000). Organizing and managing care in a changing health system. *Health Serv Res, 35*(1 Pt 1), 37-52.

Kohn, L. T. (2001). The Institute of Medicine report on medical error: overview and implications for pharmacy. *Am J Health Syst Pharm, 58*(1), 63-66.

Kolin, M. M., Minnier, T., Hale, K. M., Martin, S. C., & Thompson, L. E. (2010). Fall initiatives: redesigning best practice. *J Nurs Adm, 40*(9), 384-391.

doi:10.1097/NNA.0b013e3181ee4468

Kontio, R., Joffe, G., Putkonen, H., Kuosmanen, L., Hane, K., Holi, M., & Valimaki, M. (2012). Seclusion and restraint in psychiatry: patients' experiences and practical suggestions on how to improve practices and use alternatives. *Perspect Psychiatr Care, 48*(1), 16-24. doi:10.1111/j.1744-6163.2010.00301.x

Kool, N., van Meijel, B., Koekkoek, B., van der Bijl, J., & Kerkhof, A. (2014). Improving communication and practical skills in working with inpatients who self-harm: a pre-test/post-test study of the effects of a training programme. *BMC Psychiatry, 14*, 64. doi:10.1186/1471-244x-14-64

Kristensen, S., Hammer, A., Bartels, P., Sunol, R., Groene, O., Thompson, C. A., . . . Wagner, C. (2015). Quality management and perceptions of teamwork and safety climate in European hospitals. *Int J Qual Health Care, 27*(6), 499-506. doi:10.1093/intqhc/mzv079

Kuo, C. J., Tsai, S. Y., Liao, Y. T., Lee, W. C., Sung, X. W., & Chen, C. C. (2010). Psychiatric discharge against medical advice is a risk factor for suicide but not for other causes of death. *J Clin Psychiatry, 71*(6), 808-809. doi:10.4088/JCP.09l05404blu

Kvist, T., Voutilainen, A., Mantynen, R., & Vehvilainen-Julkunen, K. (2014). The relationship between patients' perceptions of care quality and three factors: nursing staff job satisfaction, organizational characteristics and patient age. *BMC Health Serv Res, 14*,

466. doi:10.1186/1472-6963-14-466

Labiris, G., Gitona, K., Drosou, V., & Niakas, D. (2008). A proposed instrument for the assessment of job satisfaction in Greek mental NHS hospitals. *J Med Syst, 32*(4), 333-341.

Lavallee, D. C., Chenok, K. E., Love, R. M., Petersen, C., Holve, E., Segal, C. D., & Franklin, P. D. (2016). Incorporating Patient-Reported Outcomes Into Health Care To Engage Patients And Enhance Care. *Health Aff (Millwood), 35*(4), 575-582. doi:10.1377/hlthaff.2015.1362

Leape, L., Berwick, D., Clancy, C., Conway, J., Gluck, P., Guest, J., . . . Isaac, T. (2009). Transforming healthcare: a safety imperative. *Qual Saf Health Care, 18*(6), 424-428. doi:10.1136/qshc.2009.036954

Leavitt, M. (2001). Medscape's response to the Institute of Medicine Report: Crossing the quality chasm: a new health system for the 21st century. *MedGenMed, 3*(2), 2.

Levine, R. S., Briggs, N. C., Husaini, B. A., Foster, I., Hull, P. C., Pamies, R. J., . . . Emerson, J. S. (2005). HEDIS prevention performance indicators, prevention quality assessment and Healthy People 2010. *J Health Care Poor Underserved, 16*(4 Suppl A), 64-82. doi:10.1353/hpu.2005.0125

Li, A. T. (2013). Teamwork climate and patient safety attitudes: associations among nurses and comparison with physicians in Taiwan. *J Nurs Care Qual, 28*(1), 60-67.

doi:10.1097/NCQ.0b013e318262ac45

Lied, T. R., Malsbary, R., Eisenberg, C., & Ranck, J. (2002). Combining HEDIS indicators: a new approach to measuring plan performance. *Health Care Financ Rev, 23*(4), 117-129.

Lin, E., & Durbin, J. (2008). Adapting the balanced scorecard for mental health and addictions: an inpatient example. *Healthc Policy, 3*(4), e160-174.

Ling, S., Cleverley, K., & Perivolaris, A. (2015). Understanding Mental Health Service User Experiences of Restraint Through Debriefing: A Qualitative Analysis. *Can J Psychiatry, 60*(9), 386-392. doi:10.1177/070674371506000903

Lora, A., Lesage, A., Pathare, S., & Levav, I. (2017). Information for mental health systems: an instrument for policy-making and system service quality. *Epidemiol Psychiatr Sci, 26*(4), 383-394. doi:10.1017/s2045796016000743

Lupi, S., Verzola, A., Carandina, G., Salani, M., Antonioli, P., & Gregorio, P. (2011). Multidimensional evaluation of performance with experimental application of balanced scorecard: a two year experience. *Cost Eff Resour Alloc, 9*(1), 7. doi:10.1186/1478-7547-9-7

Luttman, R. J. (1998). Next generation quality, Part 2: Balanced scorecards and organizational improvement. *Top Health Inf Manage, 19*(2), 22-29.

MacAlister, D. (2013). A physical security evaluation tool for elopement prevention in a behavioural/mental health setting. *J Healthc Prot Manage, 29*(1), 54-64.

Macdonald, M. (1998). Using the balanced scorecard to align strategy and performance in long-term care. *Healthc Manage Forum, 11*(3), 33-38. doi:10.1016/s0840-4704(10)60668-0

Mache, S., Vitzthum, K., Klapp, B. F., & Groneberg, D. A. (2012). Improving quality of medical treatment and care: are surgeons' working conditions and job satisfaction associated to patient satisfaction? *Langenbecks Arch Surg, 397*(6), 973-982. doi:10.1007/s00423-012-0963-3

Madan, A., Fowler, J. C., Allen, J. G., Ellis, T. E., Hardesty, S., Groat, M., . . . Oldham, J. (2014). Assessing and addressing patient satisfaction in a longer-term inpatient psychiatric hospital: preliminary findings on the Menninger Quality of Care measure and methodology. *Qual Manag Health Care, 23*(3), 178-187. doi:10.1097/qmh.0000000000000034

Manojlovich, M., Kerr, M., Davies, B., Squires, J., Mallick, R., & Rodger, G. L. (2014). Achieving a climate for patient safety by focusing on relationships. *Int J Qual Health Care, 26*(6), 579-584. doi:10.1093/intqhc/mzu068

Manuel, J. I., Gandy, M. E., & Rieker, D. (2015). Trends in hospital discharges and dispositions for episodes of co-occurring severe mental illness and substance use disorders. *Adm Policy Ment Health, 42*(2), 168-175. doi:10.1007/s10488-014-0540-x

Marr, T. J., & Mullen, D. M. (2004). Balanced scorecards for specialists: a tool for quality

improvement. *Minn Med, 87*(4), 46-50.

Martin, G., Ozieranski, P., Willars, J., Charles, K., Minion, J., McKee, L., & Dixon-Woods, M. (2014). Walkrounds in practice: corrupting or enhancing a quality improvement intervention? A qualitative study. *Jt Comm J Qual Patient Saf, 40*(7), 303-310.

Maslach, C., & Leiter, M. P. (2008). Early predictors of job burnout and engagement. *J Appl Psychol, 93*(3), 498-512. doi:10.1037/0021-9010.93.3.498

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annu Rev Psychol, 52*, 397-422. doi:10.1146/annurev.psych.52.1.397

Mattke, S., Epstein, A. M., & Leatherman, S. (2006). The OECD Health Care Quality Indicators Project: history and background. *Int J Qual Health Care, 18 Suppl 1*, 1-4. doi:10.1093/intqhc/mzl019

Maynard, M. T., Marshall, D., & Dean, M. D. (2012). Crew resource management and teamwork training in health care: a review of the literature and recommendations for how to leverage such interventions to enhance patient safety. *Adv Health Care Manag, 13*, 59-91.

Mazur, L., Chera, B., Mosaly, P., Taylor, K., Tracton, G., Johnson, K., . . . Marks, L. B. (2015). The association between event learning and continuous quality improvement programs and culture of patient safety. *Pract Radiat Oncol, 5*(5), 286-294. doi:10.1016/j.prro.2015.04.010

McCann, T. V., Baird, J., & Muir-Cochrane, E. (2014). Attitudes of clinical staff toward the causes and management of aggression in acute old age psychiatry inpatient units. *BMC Psychiatry, 14*, 80. doi:10.1186/1471-244x-14-80

McDermott, B. E., & Holoyda, B. J. (2014). Assessment of aggression in inpatient settings. *CNS Spectr, 19*(5), 425-431. doi:10.1017/s1092852914000224

McLaughlin, D. B. (2014). An ACA and delivery system reform update: a balanced scorecard analysis. *Healthc Exec, 29*(3), 68, 70-61.

Meliones, J. N., Alton, M., Mericle, J., Ballard, R., Cesari, J., Frush, K. S., & Mistry, K. (2008). Advances in Patient Safety

10-Year Experience Integrating Strategic Performance Improvement Initiatives: Can the Balanced Scorecard, Six Sigma(R), and Team Training All Thrive in a Single Hospital? In K. Henriksen, J. B. Battles, M. A. Keyes, & M. L. Grady (Eds.), *Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 3: Performance and Tools)*. Rockville (MD): Agency for Healthcare Research and Quality (US).

Merkouris, A., Ifantopoulos, J., Lanara, V., & Lemonidou, C. (1999). Patient satisfaction: a key concept for evaluating and improving nursing services. *J Nurs Manag, 7*(1), 19-28.

Millar, R., Mannion, R., Freeman, T., & Davies, H. T. (2013). Hospital board oversight of quality and patient safety: a narrative review and synthesis of recent empirical research. *Milbank Q, 91*(4), 738-770. doi:10.1111/1468-0009.12032

Mills, A. E., & Spencer, E. M. (2005). Values based decision making: a tool for achieving the goals of healthcare. *HEC Forum, 17*(1), 18-32.

Misener, T. R., Haddock, K. S., Gleaton, J. U., & Abu Ajamieh, A. R. (1996). Toward an international measure of job satisfaction. *Nurs Res, 45*(2), 87-91.

Mohamed, B., & Azizan, N. A. (2015). Perceived service quality's effect on patient satisfaction and behavioural compliance. *Int J Health Care Qual Assur, 28*(3), 300-314. doi:10.1108/ijhcqa-06-2014-0074

Moller-Leimkuhler, A. M., Dunkel, R., & Muller, P. (2002). [Determinants of patient satisfaction: treatment and clinical factors, subjective concept of the illness and quality of life]. *Fortschr Neurol Psychiatr, 70*(8), 410-417. doi:10.1055/s-2002-33056

Molnar, G., Keitner, L., & Swindall, L. (1985). Medicolegal problems of elopement from psychiatric units. *J Forensic Sci, 30*(1), 44-49.

Molyneux, J. (2001). Interprofessional teamworking: what makes teams work well? *J Interprof Care, 15*(1), 29-35.

Moore, D. H., Algase, D. L., Powell-Cope, G., Applegarth, S., & Beattie, E. R. (2009). A framework for managing wandering and preventing elopement. *Am J Alzheimers Dis Other Demen, 24*(3), 208-219. doi:10.1177/1533317509332625

Moran, V., O'Connor, S., & Borowitz, M. (2013). International approaches to measuring the quality of mental health care. *Epidemiol Psychiatr Sci, 22*(1), 3-7.

doi:10.1017/s2045796012000704

Morello, R. T., Lowthian, J. A., Barker, A. L., McGinnes, R., Dunt, D., & Brand, C. (2013). Strategies for improving patient safety culture in hospitals: a systematic review. *BMJ Qual Saf, 22*(1), 11-18. doi:10.1136/bmjqs-2011-000582

Mosadeghrad, A. M. (2013). Verification of a quality management theory: using a delphi study. *Int J Health Policy Manag, 1*(4), 261-271. doi:10.15171/ijhpm.2013.55

Mosadeghrad, A. M. (2014). Strategic collaborative quality management and employee job satisfaction. *Int J Health Policy Manag, 2*(4), 167-174. doi:10.15171/ijhpm.2014.38

Muir-Cochrane, E., Mosel, K., Gerace, A., Esterman, A., & Bowers, L. (2011). The profile of absconding psychiatric inpatients in Australia. *J Clin Nurs, 20*(5-6), 706-713. doi:10.1111/j.1365-2702.2010.03553.x

Munoz-Seco, E., Coll-Benejam, J. M., Torrent-Quetglas, M., & Linares-Pou, L. (2006). [Influence of organizational climate on job satisfaction among health professionals]. *Aten Primaria, 37*(4), 209-214.

Muralidhar, S., Taneja, A., & Ramesh, V. (2012). Patient safety culture-perception of health care workers in a tertiary care hospital. *Int J Risk Saf Med, 24*(4), 191-199. doi:10.3233/jrs-2012-0575

Murray, C. J., & Frenk, J. (2008). Health metrics and evaluation: strengthening the science. *Lancet, 371*(9619), 1191-1199. doi:10.1016/s0140-6736(08)60526-7

Murray, C. J., Frenk, J., & Evans, T. (2007). The Global Campaign for the Health MDGs: challenges, opportunities, and the imperative of shared learning. *Lancet, 370*(9592), 1018-1020. doi:10.1016/s0140-6736(07)61458-5

Nei, D., Snyder, L. A., & Litwiller, B. J. (2015). Promoting retention of nurses: A meta-analytic examination of causes of nurse turnover. *Health Care Manage Rev, 40*(3), 237-253. doi:10.1097/hmr.0000000000000025

Neufeld, E., Perlman, C. M., & Hirdes, J. P. (2012). Predicting inpatient aggression using the InterRAI risk of harm to others clinical assessment protocol: a tool for risk assessment and care planning. *J Behav Health Serv Res, 39*(4), 472-480. doi:10.1007/s11414-011-9271-x

Nippak, P. M., Veracion, J. I., Muia, M., Ikeda-Douglas, C. J., & Isaac, W. W. (2016). Designing and evaluating a balanced scorecard for a health information management department in a Canadian urban non-teaching hospital. *Health Informatics J, 22*(2), 120-139. doi:10.1177/1460458214537005

Nygren, M., Roback, K., Ohrn, A., Rutberg, H., Rahmqvist, M., & Nilsen, P. (2013). Factors influencing patient safety in Sweden: perceptions of patient safety officers in the county councils. *BMC Health Serv Res, 13*, 52. doi:10.1186/1472-6963-13-52

O'Brien, J. A. (2006). Creating a safe and productive atmosphere for employees. *Clin Leadersh Manag Rev, 20*(1), E6.

O'Hara, R., Johnson, M., Siriwardena, A. N., Weyman, A., Turner, J., Shaw, D., . . . Shewan, J. (2015). A qualitative study of systemic influences on paramedic decision making: care transitions and patient safety. *J Health Serv Res Policy, 20*(1 Suppl), 45-53. doi:10.1177/1355819614558472

O'Shea, L. E., Picchioni, M. M., Mason, F. L., Sugarman, P. A., & Dickens, G. L. (2014). Predictive validity of the HCR-20 for inpatient self-harm. *Compr Psychiatry, 55*(8), 1937-1949. doi:10.1016/j.comppsych.2014.07.010

Odwazny, R., Hasler, S., Abrams, R., & McNutt, R. (2005). Organizational and cultural changes for providing safe patient care. *Qual Manag Health Care, 14*(3), 132-143.

ojalehto, B., & Medin, D. L. (2015). Perspectives on culture and concepts. *Annu Rev Psychol, 66*, 249-275. doi:10.1146/annurev-psych-010814-015120

Oliveira, J. (2001). The balanced scorecard: an integrative approach to performance evaluation. *Healthc Financ Manage, 55*(5), 42-46.

Oliver, D., Healey, F., & Haines, T. P. (2010). Preventing falls and fall-related injuries in hospitals. *Clin Geriatr Med, 26*(4), 645-692. doi:10.1016/j.cger.2010.06.005

Olson, D. P., Fields, B. G., & Windish, D. M. (2015). Geographic Localization of Housestaff Inpatients Improves Patient-Provider Communication, Satisfaction, and Culture of Safety. *J Healthc Qual, 37*(6), 363-373. doi:10.1111/jhq.12054

Omer, K., Cockcroft, A., & Andersson, N. (2011). Impact of a hospital improvement initiative

in Bangladesh on patient experiences and satisfaction with services: two cross-sectional studies. *BMC Health Serv Res, 11 Suppl 2*, S10. doi:10.1186/1472-6963-11-s2-s10

Pages, K. P., Russo, J. E., Wingerson, D. K., Ries, R. K., Roy-Byrne, P. P., & Cowley, D. S. (1998). Predictors and outcome of discharge against medical advice from the psychiatric units of a general hospital. *Psychiatr Serv, 49*(9), 1187-1192. doi:10.1176/ps.49.9.1187

Papadopoulos, C., Ross, J., Stewart, D., Dack, C., James, K., & Bowers, L. (2012). The antecedents of violence and aggression within psychiatric in-patient settings. *Acta Psychiatr Scand, 125*(6), 425-439. doi:10.1111/j.1600-0447.2012.01827.x

Papovich, J. A. (1994). Patient elopement guidelines. *Nurs Qual Connect, 4*(3), 4.

Parameswaran, S. G., Spaeth-Rublee, B., & Pincus, H. A. (2015). Measuring the quality of mental health care: consensus perspectives from selected industrialized countries. *Adm Policy Ment Health, 42*(3), 288-295. doi:10.1007/s10488-014-0569-x

Parmelli, E., Flodgren, G., Beyer, F., Baillie, N., Schaafsma, M. E., & Eccles, M. P. (2011). The effectiveness of strategies to change organisational culture to improve healthcare performance: a systematic review. *Implement Sci, 6*, 33. doi:10.1186/1748-5908-6-33

Pezaro, S., Clyne, W., & Fulton, E. A. (2017). A systematic mixed-methods review of interventions, outcomes and experiences for midwives and student midwives in

work-related psychological distress. *Midwifery, 50*, 163-173. doi:10.1016/j.midw.2017.04.003

Phillips, N. L., Stargatt, R., & Fisher, L. (2011). Risk assessment: predicting physical aggression in child psychiatric inpatient units. *Aust N Z J Psychiatry, 45*(8), 638-645. doi:10.3109/00048674.2011.587396

Pink, G. H., McKillop, I., Schraa, E. G., Preyra, C., Montgomery, C., & Baker, G. R. (2001). Creating a balanced scorecard for a hospital system. *J Health Care Finance, 27*(3), 1-20.

Pink, G. H., Slifkin, R. T., Coburn, A. F., & Gale, J. A. (2004). Comparative performance data for critical access hospitals. *J Rural Health, 20*(4), 374-382.

Porter, M. E. (2009). A strategy for health care reform--toward a value-based system. *N Engl J Med, 361*(2), 109-112. doi:10.1056/NEJMp0904131

Quigley, P., Neily, J., Watson, M., Wright, M., & Strobe, K. (2007). Measuring fall program outcomes. *Online J Issues Nurs, 12*(2), 8.

Quigley, P. A., Campbell, R. R., Bulat, T., Olney, R. L., Buerhaus, P., & Needleman, J. (2012). Incidence and cost of serious fall-related injuries in nursing homes. *Clin Nurs Res, 21*(1), 10-23. doi:10.1177/1054773811414180

Raboch, J., Kalisova, L., Nawka, A., Kitzlerova, E., Onchev, G., Karastergiou, A., . . . Kallert, T. W. (2010). Use of coercive measures during involuntary hospitalization: findings from

ten European countries. *Psychiatr Serv, 61*(10), 1012-1017. doi:10.1176/ps.2010.61.10.1012

Rago, W. V., & Reid, W. H. (1991). Total quality management strategies in mental health systems. *J Ment Health Adm, 18*(3), 253-263.

Ramsay, A. I., Turner, S., Cavell, G., Oborne, C. A., Thomas, R. E., Cookson, G., & Fulop, N. J. (2014). Governing patient safety: lessons learned from a mixed methods evaluation of implementing a ward-level medication safety scorecard in two English NHS hospitals. *BMJ Qual Saf, 23*(2), 136-146. doi:10.1136/bmjqs-2012-001730

Rangnekar, A., Johnson, T., Garman, A., & O'Neil, P. (2015). The Relationship Between Hospital Value-Based Purchasing Program Scores and Hospital Bond Ratings. *J Healthc Manag, 60*(3), 220-231.

Reerink, E. (1990). Defining quality of care: mission impossible? *Qual Assur Health Care, 2*(3-4), 197-202.

Revicki, D., Hays, R. D., Cella, D., & Sloan, J. (2008). Recommended methods for determining responsiveness and minimally important differences for patient-reported outcomes. *J Clin Epidemiol, 61*(2), 102-109. doi:10.1016/j.jclinepi.2007.03.012

Richmond, I., Dandridge, L., & Jones, K. (1991). Changing nursing practice to prevent elopement. *J Nurs Care Qual, 6*(1), 73-81.

Riechmann, M., & Stahl, K. (2013). [Employee satisfaction in hospitals - validation of the

Picker employee questionnaire: the German version of the "survey of employee perceptions of health care delivery" (Picker Institute Boston)]. *Gesundheitswesen, 75*(5), e34-48. doi:10.1055/s-0033-1343435

Riga, M., Vozikis, A., Pollalis, Y., & Souliotis, K. (2015). MERIS (Medical Error Reporting Information System) as an innovative patient safety intervention: a health policy perspective. *Health Policy, 119*(4), 539-548. doi:10.1016/j.healthpol.2014.12.006

Rivard, P. E., Parker, V. A., & Rosen, A. K. (2013). Quality improvement for patient safety: project-level versus program-level learning. *Health Care Manage Rev, 38*(1), 40-50. doi:10.1097/HMR.0b013e318245019f

Roche, B. G., & Sommer, C. (1995). [Quality assurance and quality improvement. Personal experiences and intentions]. *Swiss Surg*(1), 67-73.

Romig, M., Goeschel, C., Pronovost, P., & Berenholtz, S. M. (2010). Integrating CUSP and TRIP to improve patient safety. *Hosp Pract (1995), 38*(4), 114-121. doi:10.3810/hp.2010.11.348

Rotar, A. M., van den Berg, M. J., Kringos, D. S., & Klazinga, N. S. (2016). Reporting and use of the OECD Health Care Quality Indicators at national and regional level in 15 countries. *Int J Qual Health Care, 28*(3), 398-404. doi:10.1093/intqhc/mzw027

Rozovsky, L. E., & Rozovsky, F. A. (1986). Legal implications when residents elope. *Long Term Care (Don Mills), 2*(1), L6-7.

Rubin, H. R., Pronovost, P., & Diette, G. B. (2001). From a process of care to a measure: the development and testing of a quality indicator. *Int J Qual Health Care, 13*(6), 489-496.

Sacks, G. D., Shannon, E. M., Dawes, A. J., Rollo, J. C., Nguyen, D. K., Russell, M. M., . . . Maggard-Gibbons, M. A. (2015). Teamwork, communication and safety climate: a systematic review of interventions to improve surgical culture. *BMJ Qual Saf, 24*(7), 458-467. doi:10.1136/bmjqs-2014-003764

Sakinofsky, I. (2014). Preventing suicide among inpatients. *Can J Psychiatry, 59*(3), 131-140. doi:10.1177/070674371405900304

Salas, E., DiazGranados, D., Klein, C., Burke, C. S., Stagl, K. C., Goodwin, G. F., & Halpin, S. M. (2008). Does team training improve team performance? A meta-analysis. *Hum Factors, 50*(6), 903-933. doi:10.1518/001872008x375009

Salas, E., DiazGranados, D., Weaver, S. J., & King, H. (2008). Does team training work? Principles for health care. *Acad Emerg Med, 15*(11), 1002-1009. doi:10.1111/j.1553-2712.2008.00254.x

Sammer, C. E., Lykens, K., Singh, K. P., Mains, D. A., & Lackan, N. A. (2010). What is patient safety culture? A review of the literature. *J Nurs Scholarsh, 42*(2), 156-165. doi:10.1111/j.1547-5069.2009.01330.x

Sansone, R. A., Gaither, G. A., & Songer, D. A. (2002). The relationships among childhood abuse, borderline personality, and self-harm behavior in psychiatric inpatients.

Violence Vict, 17(1), 49-55.

Schmidt, S., Bateman, I., Breinlinger-O'Reilly, J., & Smith, P. (2006). A management approach that drives actions strategically: balanced scorecard in a mental health trust case study. *Int J Health Care Qual Assur Inc Leadersh Health Serv, 19*(2-3), 119-135.

Schneider, E. C., Riehl, V., Courte-Wienecke, S., Eddy, D. M., & Sennett, C. (1999). Enhancing performance measurement: NCQA's road map for a health information framework. National Committee for Quality Assurance. *Jama, 282*(12), 1184-1190.

Schroder, A., Larsson, B. W., Ahlstrom, G., & Lundqvist, L. O. (2010). Psychometric properties of the instrument quality in psychiatric care and descriptions of quality of care among in-patients. *Int J Health Care Qual Assur, 23*(6), 554-570. doi:10.1108/09526861011060924

Sclar, D. A., & Robison, L. M. (2010). Hospital admission for schizophrenia and discharge against medical advice in the United States. *Prim Care Companion J Clin Psychiatry, 12*(2). doi:10.4088/PCC.09m00827yel

Scotti, D. J., Harmon, J., & Behson, S. J. (2007). Links among high-performance work environment, service quality, and customer satisfaction: an extension to the healthcare sector. *J Healthc Manag, 52*(2), 109-124; discussion 124-105.

Seibert, S. E., Wang, G., & Courtright, S. H. (2011). Antecedents and consequences of psychological and team empowerment in organizations: a meta-analytic review. *J*

Appl Psychol, 96(5), 981-1003. doi:10.1037/a0022676

Shi, Y., Sears, L. E., Coberley, C. R., & Pope, J. E. (2013). Classification of individual well-being scores for the determination of adverse health and productivity outcomes in employee populations. *Popul Health Manag, 16*(2), 90-98. doi:10.1089/pop.2012.0039

Shoemaker, L. K., & Fischer, B. (2011). Creating a nursing strategic planning framework based on evidence. *Nurs Clin North Am, 46*(1), 11-25. doi:10.1016/j.cnur.2010.10.007

Shojania, K. G., & Grimshaw, J. M. (2005). Evidence-based quality improvement: the state of the science. *Health Aff (Millwood), 24*(1), 138-150. doi:10.1377/hlthaff.24.1.138

Sidani, S., Collins, L., Harbman, P., MacMillan, K., Reeves, S., Hurlock-Chorostecki, C., . . . van Soeren, M. (2014). Development of a measure to assess healthcare providers' implementation of patient-centered care. *Worldviews Evid Based Nurs, 11*(4), 248-257. doi:10.1111/wvn.12047

Simons, P. A., Houben, R., Vlayen, A., Hellings, J., Pijls-Johannesma, M., Marneffe, W., & Vandijck, D. (2015). Does lean management improve patient safety culture? An extensive evaluation of safety culture in a radiotherapy institute. *Eur J Oncol Nurs, 19*(1), 29-37. doi:10.1016/j.ejon.2014.08.001

Singh, S. R., & Wheeler, J. (2012). Hospital financial management: what is the link between revenue cycle management, profitability, and not-for-profit hospitals' ability to grow

equity? *J Healthc Manag, 57*(5), 325-339; discussion 339-341.

Smith, T. A. (2012). Hospital security and patient elopement: protecting patients and your healthcare facility. *J Healthc Prot Manage, 28*(1), 7-20.

Sonntag, A., & Koch, H. J. (2012). [Quality management in psychiatry: evaluation of an ergotherapeutical questionnaire before and after treatment]. *Versicherungsmedizin, 64*(2), 66-69.

Sorra, J., Khanna, K., Dyer, N., Mardon, R., & Famolaro, T. (2012). Exploring relationships between patient safety culture and patients' assessments of hospital care. *J Patient Saf, 8*(3), 131-139. doi:10.1097/PTS.0b013e318258ca46

Spaeth-Rublee, B., Pincus, H. A., Silvestri, F., & Peters, J. (2014). Measuring quality of mental health care: an international comparison. *Int J Environ Res Public Health, 11*(10), 10384-10389. doi:10.3390/ijerph111010384

Spence Laschinger, H. K., & Fida, R. (2015). Linking nurses' perceptions of patient care quality to job satisfaction: the role of authentic leadership and empowering professional practice environments. *J Nurs Adm, 45*(5), 276-283. doi:10.1097/nna.0000000000000198

Spencer, F. C. (2000). Human error in hospitals and industrial accidents: current concepts. *J Am Coll Surg, 191*(4), 410-418.

Spreitzer, G., & Porath, C. (2012). Creating sustainable performance. *Harv Bus Rev, 90*(1-2),

92-99, 152.

Stavropoulou, C., Doherty, C., & Tosey, P. (2015). How Effective Are Incident-Reporting Systems for Improving Patient Safety? A Systematic Literature Review. *Milbank Q, 93*(4), 826-866. doi:10.1111/1468-0009.12166

Stenberg, M., & Wann-Hansson, C. (2011). Health care professionals' attitudes and compliance to clinical practice guidelines to prevent falls and fall injuries. *Worldviews Evid Based Nurs, 8*(2), 87-95. doi:10.1111/j.1741-6787.2010.00196.x

Stiles, P. G., Boothroyd, R. A., Dhont, K., Beiler, P. F., & Green, A. E. (2009). Adherence to practice guidelines, clinical outcomes, and costs among Medicaid enrollees with severe mental illnesses. *Eval Health Prof, 32*(1), 69-89. doi:10.1177/0163278708328744

Stone, P. W., Hughes, R., & Dailey, M. (2008). Advances in Patient Safety Creating a Safe and High-Quality Health Care Environment. In R. G. Hughes (Ed.), *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville (MD): Agency for Healthcare Research and Quality (US).

Szymaniak, S. (2015). Accurate falls risk assessment and interventions for preventing falls in patients in the acute care setting within a private hospital in a large capital city: a best practice implementation project. *JBI Database System Rev Implement Rep, 13*(9), 386-406. doi:10.11124/jbisrir-2015-2089

Talachi, R. K., Gorji, M. B., & Boerhannoeddin, A. B. (2014). An investigation of the role of job satisfaction in employees' organizational citizenship behavior. *Coll Antropol, 38*(2), 429-436.

Taormina, R. J., & Gao, J. H. (2013). Maslow and the motivation hierarchy: measuring satisfaction of the needs. *Am J Psychol, 126*(2), 155-177.

Targum, S. D., Capodanno, A. E., Hoffman, H. A., & Foudraine, C. (1982). An intervention to reduce the rate of hospital discharges against medical advice. *Am J Psychiatry, 139*(5), 657-659. doi:10.1176/ajp.139.5.657

Taylor, P. J., Hutton, P., & Wood, L. (2015). Are people at risk of psychosis also at risk of suicide and self-harm? A systematic review and meta-analysis. *Psychol Med, 45*(5), 911-926. doi:10.1017/s0033291714002074

Thomas-Hawkins, C., & Flynn, L. (2015). Patient safety culture and nurse-reported adverse events in outpatient hemodialysis units. *Res Theory Nurs Pract, 29*(1), 53-65.

Thomas, E. J., Sexton, J. B., Neilands, T. B., Frankel, A., & Helmreich, R. L. (2005). Correction: The effect of executive walk rounds on nurse safety climate attitudes: A randomized trial of clinical units [ISRCTN85147255]. *BMC Health Serv Res, 5*, 46. doi:10.1186/1472-6963-5-46

Tsai, Y., & Wu, S. W. (2010). The relationships between organisational citizenship behaviour, job satisfaction and turnover intention. *J Clin Nurs, 19*(23-24), 3564-3574.

doi:10.1111/j.1365-2702.2010.03375.x

Tsasis, P., & Harber, B. (2008). Using the balanced scorecard to mobilize human resources in organizational transformation. *Health Serv Manage Res, 21*(2), 71-80. doi:10.1258/hsmr.2007.007008

Urheim, R., Rypdal, K., Melkevik, O., Hoff, H. A., Mykletun, A., & Palmstierna, T. (2014). Motivational dimensions of inpatient aggression. *Crim Behav Ment Health, 24*(2), 141-150. doi:10.1002/cbm.1894

Van Bogaert, P., Clarke, S., Willems, R., & Mondelaers, M. (2013). Staff engagement as a target for managing work environments in psychiatric hospitals: implications for workforce stability and quality of care. *J Clin Nurs, 22*(11-12), 1717-1728. doi:10.1111/j.1365-2702.2012.04341.x

Van Den Assem, B., & Dulewicz, V. (2015). Doctors' trustworthiness, practice orientation, performance and patient satisfaction. *Int J Health Care Qual Assur, 28*(1), 82-95. doi:10.1108/ijhcqa-04-2013-0037

van Dongen, J. D., Buck, N. M., & van Marle, H. J. (2012). Delusional distress partly explains the relation between persecutory ideations and inpatient aggression on the ward. *Psychiatry Res, 200*(2-3), 779-783. doi:10.1016/j.psychres.2012.05.016

Varkey, P., Karlapudi, S. P., & Hensrud, D. D. (2008). The impact of a quality improvement program on employee satisfaction in an academic microsystem. *Am J Med Qual,*

23(3), 215-221. doi:10.1177/1062860608314957

Vermeeren, B., Steijn, B., Tummers, L., Lankhaar, M., Poerstamper, R. J., & van Beek, S. (2014). HRM and its effect on employee, organizational and financial outcomes in health care organizations. *Hum Resour Health, 12*, 35. doi:10.1186/1478-4491-12-35

Vermeir, P., Vandijck, D., Degroote, S., Peleman, R., Verhaeghe, R., Mortier, E., . . . Vogelaers, D. (2015). Communication in healthcare: a narrative review of the literature and practical recommendations. *Int J Clin Pract, 69*(11), 1257-1267. doi:10.1111/ijcp.12686

Villalbi, J. R., Casas, C., Borrell, C., Duran, J., Artazcoz, L., Camprubi, E., . . . Armengol, J. M. (2007). [The Balanced Scorecard as a management tool in a public health organization]. *Gac Sanit, 21*(1), 60-65.

Vincent, C., Taylor-Adams, S., & Stanhope, N. (1998). Framework for analysing risk and safety in clinical medicine. *Bmj, 316*(7138), 1154-1157.

Wakefield, J. G., McLaws, M. L., Whitby, M., & Patton, L. (2010). Patient safety culture: factors that influence clinician involvement in patient safety behaviours. *Qual Saf Health Care, 19*(6), 585-591. doi:10.1136/qshc.2008.030700

Wand, T., Isobel, S., & Derrick, K. (2015). Surveying clinician perceptions of risk assessment and management practices in mental health service provision. *Australas Psychiatry, 23*(2), 147-153. doi:10.1177/1039856214568227

Wang, B. B., Wan, T. T., Falk, J. A., & Goodwin, D. (2001). Management strategies and financial performance in rural and urban hospitals. *J Med Syst, 25*(4), 241-255.

Wang, P. S., Demler, O., & Kessler, R. C. (2002). Adequacy of treatment for serious mental illness in the United States. *Am J Public Health, 92*(1), 92-98.

Weaver, S. J., Lubomksi, L. H., Wilson, R. F., Pfoh, E. R., Martinez, K. A., & Dy, S. M. (2013). Promoting a culture of safety as a patient safety strategy: a systematic review. *Ann Intern Med, 158*(5 Pt 2), 369-374. doi:10.7326/0003-4819-158-5-201303051-00002

Weaver, S. J., Rosen, M. A., DiazGranados, D., Lazzara, E. H., Lyons, R., Salas, E., . . . King, H. B. (2010). Does teamwork improve performance in the operating room? A multilevel evaluation. *Jt Comm J Qual Patient Saf, 36*(3), 133-142.

Weber, D. (1999). Performance management--the balanced scorecard: a framework for managing complex and rapid change. *Strateg Healthc Excell, 12*(11), 1-7.

Weir, E., d'Entremont, N., Stalker, S., Kurji, K., & Robinson, V. (2009). Applying the balanced scorecard to local public health performance measurement: deliberations and decisions. *BMC Public Health, 9*, 127. doi:10.1186/1471-2458-9-127

Weller, J., Boyd, M., & Cumin, D. (2014). Teams, tribes and patient safety: overcoming barriers to effective teamwork in healthcare. *Postgrad Med J, 90*(1061), 149-154. doi:10.1136/postgradmedj-2012-131168

Wells, R., & Weiner, B. (2005). Using the balanced scorecard to characterize benefits of

integration in the safety net. *Health Serv Manage Res, 18*(2), 109-123. doi:10.1258/0951484053723126

Westbrook, J. I. (1993). Patient satisfaction: methodological issues and research findings. *Aust Health Rev, 16*(1), 75-88.

Wheeler, G. L., Beck, N. C., Manderino, M., Tackett-Nelson, S., & Gamache, M. (1984). Prediction of potential against medical advice discharges in psychiatric settings. *Issues Ment Health Nurs, 6*(1-2), 163-172.

Wicks, A. M., & St Clair, L. (2007). Competing values in healthcare: balancing the (un)balanced scorecard. *J Healthc Manag, 52*(5), 309-323; discussion 323-304.

Williams, L. (2011). Resident elopement: lawsuit case study and lessons learned. *J Healthc Prot Manage, 27*(1), 64-68.

Woitha, K., Van Beek, K., Ahmed, N., Jaspers, B., Mollard, J. M., Ahmedzai, S. H., . . . Engels, Y. (2014). Validation of quality indicators for the organization of palliative care: a modified RAND Delphi study in seven European countries (the Europall project). *Palliat Med, 28*(2), 121-129. doi:10.1177/0269216313493952

Wong, P., Helsinger, D., & Petry, J. (2002). Providing the right infrastructure to lead the culture change for patient safety. *Jt Comm J Qual Improv, 28*(7), 363-372.

Wright, T. A., & Cropanzano, R. (2000). Psychological well-being and job satisfaction as predictors of job performance. *J Occup Health Psychol, 5*(1), 84-94.

Wu, I. L., & Kuo, Y. Z. (2012). A balanced scorecard approach in assessing IT value in healthcare sector: an empirical examination. *J Med Syst, 36*(6), 3583-3596. doi:10.1007/s10916-012-9834-2

Yang, J., Liu, Y., Chen, Y., & Pan, X. (2014). The effect of structural empowerment and organizational commitment on Chinese nurses' job satisfaction. *Appl Nurs Res, 27*(3), 186-191. doi:10.1016/j.apnr.2013.12.001

Yang, M. C., & Tung, Y. C. (2006). Using path analysis to examine causal relationships among balanced scorecard performance indicators for general hospitals: the case of a public hospital system in Taiwan. *Health Care Manage Rev, 31*(4), 280-288.

Yates, G. R., Bernd, D. L., Sayles, S. M., Stockmeier, C. A., Burke, G., & Merti, G. E. (2005). Building and sustaining a systemwide culture of safety. *Jt Comm J Qual Patient Saf, 31*(12), 684-689.

Yeh, T. M., & Lai, H. P. (2015). Evaluating the effectiveness of implementing quality management practices in the medical industry. *J Nutr Health Aging, 19*(1), 102-112. doi:10.1007/s12603-014-0486-4

Yellen, E., Davis, G. C., & Ricard, R. (2002). The measurement of patient satisfaction. *J Nurs Care Qual, 16*(4), 23-29.

Zalenski, R. J., & Raspa, R. (2006). Maslow's hierarchy of needs: a framework for achieving human potential in hospice. *J Palliat Med, 9*(5), 1120-1127.

doi:10.1089/jpm.2006.9.1120

Zbinden, A. M. (2002). Introducing a balanced scorecard management system in a university anesthesiology department. *Anesth Analg, 95*(6), 1731-1738, table of contents.

Zelman, W. N., Pink, G. H., & Matthias, C. B. (2003). Use of the balanced scorecard in health care. *J Health Care Finance, 29*(4), 1-16.

Zenlea, I. S., Billett, A., Hazen, M., Herrick, D. B., Nakamura, M. M., Jenkins, K. J., . . . Kesselheim, J. C. (2014). Trainee and program director perceptions of quality improvement and patient safety education: preparing for the next accreditation system. *Clin Pediatr (Phila), 53*(13), 1248-1254. doi:10.1177/0009922814538701

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